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Proliferation, Potential TMD Roles, Demarcation and ABM Treaty Compatibility

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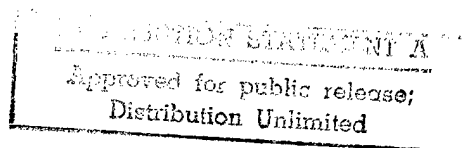
Dr. Keith B. Payne (Study Director)

**Dr. Sergei Blagovolin
Dr. Stephen Cambone
Amb. Sidney Graybeal
Dr. Patricia McFate**

**Dr. Alexander Savelyev
Mr. Willis Stanley
Ms. Linda Vlahos**

Senior Review Group:

**Dr. Kathleen Bailey
Amb. Max Kampelman
Lt Gen Glenn Kent, USAF (Ret.)
LTG William Odom, USA (Ret.)**



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Dr. Kathleen Bailey is a Senior Fellow at Lawrence Livermore National Laboratory. She served as Assistant Director of the U.S. Arms Control and Disarmament Agency from 1987 to 1990, where she was responsible for policies on nuclear, chemical, missile, and advanced conventional weapons proliferation. Dr. Bailey previously served as Deputy Assistant Secretary of State in the Bureau of Intelligence and Research, Deputy and Acting Director of Research at the U.S. Information Agency, and Associate Division Leader at Lawrence Livermore National Laboratory.

Prof. Sergei Blagovolin is Deputy Director of the internationally-renowned Institute for the World Economy and International Relations and President of the Institute for National Security and Strategic Studies in Moscow.

Dr. Stephen Cambone is a Senior Fellow of CSIS. He is the former Director of the Strategic Defense Policy Office of the Office of the Secretary of Defense and former member of the Global Protection System High Level Group.

Amb. Sidney Graybeal is Chief Scientist and Deputy Director of the Center for National Security Negotiations at SAIC. He has served on the U.S. SALT Delegation and was the first U.S. Commissioner of the Standing Consultative Commission. He is a member of the Defense Policy Board.

Amb. Max Kampelman is a partner in the law firm of Fried, Frank, Harris, and Jacobsen and is Vice Chairman of the Board of the United States Institute of Peace. He has served in numerous senior governmental positions, including Counselor of the Department of State and Ambassador and Head of the U.S. Delegation to the Negotiations on Nuclear and Space Arms in Geneva. Ambassador Kampelman also was appointed by President Carter and reappointed by President Reagan to serve as Ambassador and Head of the U.S. Delegation to the Conference on Security and Cooperation in Europe.

Lt Gen Glenn Kent, USAF (Ret.) is a Senior Staff Member at RAND. He was the first Assistant Chief of Staff, U.S. Air Force, for Studies and Analysis and has served as Director of the Weapons Systems Evaluation Group, Office of the Secretary of Defense and Member of the U.S. Air Force Scientific Advisory Board. General Kent's current research efforts address a cross section of national security subjects focussed on strategy development and the allocation of defense resources.

Dr. Patricia McFate is Senior Scientist and Program Director of the Center for National Security Negotiations, SAIC. She is a Fellow of the New York Academy of Sciences and a member of the Council of Foreign Relations.

LTG William E. Odom, USA (Ret.) is Director of National Security Studies for Hudson Institute and an adjunct professor at Yale University. General Odom has served in numerous senior governmental position, including Director of the National Security Agency; Assistant Chief of Staff for Intelligence, U.S. Army; and military assistant to President Carter's National Security Advisor, Zbigniew Brzezinski.

Dr. Keith Payne is President of the National Institute for Public Policy, Editor-in-Chief of *Comparative Strategy*, and Adjunct Professor of National Security Studies at Georgetown University. Dr. Payne is the author or editor of twelve books and over 65 published articles on arms control, missile defense, and other international security issues. He served as the director of this study.

Dr. Alexander Savelyev is Vice President of the Institute for National Security and Strategic Studies in Moscow. He is an expert on arms control and disarmament issues and was a member of the Soviet-American START negotiations in Geneva and an advisor to the Defense and Space Talks.

Mr. Willis Stanley is a policy analyst the National Institute for Public Policy specializing in proliferation issues, arms control, U.S.-Russian relations.

Ms. Linda Vlahos is a senior policy analyst at the National Institute for Public Policy specializing in the study of Soviet/Russian military doctrine, strategy, programs, foreign and arms control policies.

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Proliferation, Potential TMD Roles, Demarcation and ABM Treaty Compatibility¹

Purpose of Study: To address criticism of the Administration's publicly-announced position concerning the demarcation between theater and strategic ballistic missile defense systems. The current lack of an agreed demarcation line between theater and strategic missile defense is an issue of concern because both the United States and Russia are interested in deploying effective theater missile defenses (TMD), but do not want to undermine the 1972 ABM Treaty, which was intended to limit ballistic missile defenses (BMD) against long-range *strategic* offensive missiles.

The Administration's publicly-announced position concerning demarcation is that a missile defense system will be considered *strategic* if it is tested against a target vehicle with a velocity of more than 5 km/second (modern strategic ballistic missiles have velocities of 7 km/sec or more). The proposed demarcation line is to be based on the *demonstrated* capabilities of the defensive system.

Some members of the traditional arms control community (who fear erosion of the ABM Treaty) have advanced arguments in opposition to the Clinton Administration's TMD program and publicly-announced demarcation position. These arguments are addressed in the study as follows:

Critique 1) The administration has accepted as serious a non-existent threat (i.e., missile proliferation) in order to justify its proposed TMD system.

Response: The proliferation of theater-class ballistic missiles is recognized by the intelligence community. For example, North Korea is developing two new missiles, the so-called Taepodong 1 and 2, with ranges from 2,000 kms to 3,500 kms or more. These developments pose a *direct* threat to Western military forces in power projection operations; and an *indirect* threat where the presence of missiles/WMD, and the vulnerability of Western population centers, could deter the West from projecting power in response to regional crises.

Critique 2) Deterrence can address any prospective missile threat, as it did during the Cold War. Consequently, significant resources should not be devoted to TMD.

Response: The re-emergence of deep seated religious and ethnic conflicts suggests that the mutual deterrence and restraint of the Cold War may not hold in future crises. Today, the increasing number of potential opponents armed with missiles and weapons of mass destruction, and the general lack of

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knowledge and understanding of their leaders must reduce the confidence that the West can place on policies of deterrence. *Deterrence will continue to be critical in some cases, but is likely to be irrelevant or unworkable in others.*

Critique 3) The focus on TMD is an example of an increased emphasis on counterproliferation, which suggests that the Nonproliferation Treaty, the Missile Technology Control Regime, and other forms of diplomacy are ineffective in stemming proliferation.

Response: Efforts by industrialized nations to control the proliferation of ballistic missiles and WMD are becoming increasingly difficult as the trade in technology and systems within the developing world increases. The collapse of the Soviet Union exacerbates this situation. While technology and export controls may help delay and increase the costs of the proliferation of missile technologies, ultimately they cannot prevent proliferation from "rogue" states. TMD, however, can contribute significantly to both traditional nonproliferation efforts, and to counterproliferation options that may become necessary.

Critique 4) Proposed US TMD systems, under the US ABM Treaty demarcation proposal, would have significant strategic ABM capabilities, eviscerating the intent and purpose of the treaty.

Response: The PAC-3 program and Navy lower-tier have no operational capability against strategic ballistic missiles. Against a modern strategic ballistic missile, THAAD has little or no capability to defend itself, much less the entire United States. It is hardly a system in which reliance can be placed to absorb either a retaliatory strike or a first strike, even at the lower level of offensive forces contemplated by START II.

Critique 5) The Clinton Administration's proposed demonstrated standard for ABM Treaty demarcation could permit TMD systems to have inherent strategic capabilities, but remain outside ABM Treaty constraints, thus undermining the ABM Treaty.

Response: The proposed demonstrated standard for ABM Treaty demarcation is entirely consistent with the ABM Treaty's intent, terms, and established verification regime. National Technical Means have been and are the acknowledged basis for the treaty's verification, and the demonstrated standard is uniquely compatible with verification by NTM. It is ironic that current critics of the "demonstrated" standard used this same standard in dismissing the treaty implications of Soviet "Sam Upgrade" in the 1970s. (i.e., they questioned not whether some Soviet Sams had strategic ABM potential, but whether the potential had been "demonstrated" clearly by testing in an ABM mode).

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Table of Contents

Key Findings	1
Executive Summary	1
Introduction.....	6
The Critics' Charges	6
Proliferation: A Contrived Threat?	7
A Real Threat: Implications of Proliferation for International Stability.....	10
Direct and Indirect Threats	10
Traditional Nonproliferation Measures: Deterrence and Diplomacy Instead of TMD?	11
Deterrence?.....	11
Technology Controls?	14
Potential Roles for Theater Ballistic Missile Defense: Contributions to Nonproliferation and Counterproliferation	16
The ABM Treaty and U.S. Proposals: Giving TMD Too Much Capability?	18
The U.S. TMD Program	19
Near Term TMD Initiatives	19
Core TMD Systems	19
Advanced TMD Capabilities	22
The Intent of the ABM Treaty and Theater Missile Defense.....	25
Why Footprint Analysis is Misleading	26
The ABM Treaty and Space Sensors	28
Why U.S. TMD Systems Are Not Strategically Significant?	30
The Threat from "Rogue Nations" Demands Highly-Capable Interceptors	31
THAAD Has No Significant Strategic Operations Capability.....	32
Limitations on Radar Performance.....	33
The Significance of Multilateralization for the Demarcation Debate.....	33
Notes	34

KEY FINDINGS

- The theater ballistic missile threat is real and growing.
- This threat poses unprecedented challenges to international security and stability.
- Traditional nonproliferation measures, such as deterrence and export controls, are helpful in countering proliferation, but ultimately inadequate.
- Theater missile defense (TMD) systems will provide unique and significant contributions to U.S. nonproliferation and counterproliferation efforts.
- TMD systems must be available in the same time frame as the threat.
- The U.S. missile defense program has been structured to provide highly effective defense against theater missile threats in the near-term and *as they emerge*.
- Planned U.S. TMD Systems will not provide significant capability against *strategic* ballistic missiles; the program is fully consistent with the ABM Treaty.
- Defensive footprint analysis, often used by critics of the U.S. TMD program to suggest that U.S. TMD systems would have significant strategic capability, is misleading because footprint size is highly dependent on variables that may not be controlled. It is a theoretical representation of system capabilities which does not capture real world factors significant to actual system performance.
- The Clinton Administration's publicly-announced ABM Treaty "Demarcation" proposal of permitting TMD testing against targets with maximum velocities of 5 km/sec, and verification based on demonstrated capabilities, is completely consistent with the

intent of the ABM Treaty and its verification regime.

- Suggestions that Demarcation issues can be settled "for now" and reopened later should the need arise, may run into difficulties if the ABM Treaty is multilateralized: future adjustments may become more complex, or even non-negotiable, as more parties are included in the negotiations.

EXECUTIVE SUMMARY

One of the prominent features of the post-Cold War international order is the proliferation of weapons of mass destruction (WMD), including nuclear, chemical, and biological weapons, and the proliferation of ballistic missiles capable of delivering those weapons. Given this emerging missile threat to U.S. allies and forces deployed abroad, the Ballistic Missile Defense Organization has been directed by the Clinton Administration to focus its primary efforts toward "developing deployable advanced theater missile defenses to protect U.S. forward-deployed forces, allies, and friends [as] an important element of the Counterproliferation Initiative" [1].

A complicating factor, however, is that the U.S.-Soviet ABM Treaty of 1972 strictly limits U.S. and Russian defenses against long-range *strategic* missiles, without providing a precise Demarcation line separating these strategic defenses from defenses against shorter-range *non-strategic* theater missiles—the type of missiles now spreading in the developing world. Consequently, the Clinton Administration is addressing the issue of how it can continue to abide by the ABM Treaty—a Treaty for which it has declared strong support—and simultaneously pursue the "highly effective theater missile defenses" (TMD) necessary for counterproliferation purposes. The Administration has proposed to Russian negotiators a clarification of the ABM Treaty in the Standing Consultative Commission (SCC) which would permit each side to deploy TMD systems in a manner consistent with the intent of the Treaty.* The U.S. proposal would identify as permitted TMD a defensive system tested against a ballistic missile target traveling at a

*Because the proceedings of the SCC are confidential, this study focuses on those elements of the discussions that have been made public.

maximum speed of 5 km/sec. That is, the proposed 5 km/sec threshold would be the "Demarcation" line between TMD and *strategic* ballistic missile defense, the latter continuing to be strictly controlled by the ABM Treaty.

The Clinton Administration's ABM Treaty Demarcation negotiating agenda has encountered vigorous opposition from some members of the unofficial "arms control community." Arguments against the Clinton Administration's TMD program and Demarcation proposal include:

1) The administration has accepted as serious a non-existent threat (i.e., the proliferation of ballistic missiles) in order to justify its proposed TMD system. Further, deterrence can address any prospective missile threat, as it did during the Cold War. Consequently, significant resources should not be devoted to TMD.

2) The focus on TMD is an example of an increased emphasis on counterproliferation which suggests that the Nuclear Nonproliferation Treaty (NPT), the Missile Technology Control Regime (MTCR), Chemical Weapons Convention (CWC), and other forms of diplomacy are ineffective in stemming proliferation.

3) Proposed U.S. TMD systems, under the U.S. ABM Treaty Demarcation proposal, would have significant *strategic* ABM capabilities; therefore, defining the ABM Treaty so as to permit their development, testing, and deployment would eviscerate the intent and purpose of the Treaty. "Defensive footprint" analysis illustrates the magnitude of these potential strategic capabilities.

Key findings of this report are:

1) There is a real threat from the proliferation of ballistic missiles.

At least 12 developing countries have "Scud class" or better systems (ranges of approximately 300 km and greater). Of particular concern are those missile programs in Iran, Syria, Libya and especially North Korea. North Korea has successfully flight-tested the 1000 km *Nodong-1*, and has made active efforts to sell the *Nodong-1*—which is capable of carrying conventional and WMD warheads—on the international market. North Korea has pursued sales

of these missiles to countries hostile to the United States, including to Iran; Libya too is anxious to acquire North Korean missiles. If Iran and Libya do purchase the *Nodong-1*, cities in Russia, Greece, Italy, and Turkey will be under the potential threat of Iranian or Libyan WMD. North Korea also is developing two new missiles, the so-called *Taepodong-1* and the *Taepodong-2*. Unofficial public estimates suggest that the *Taepodong-1* may have a range of 2,000 km and the *Taepodong-2* a range of from 3,500 km to 9,600 km. If countries such as North Korea, Iran and Libya ultimately possess North Korean *Taepodong-2* missiles, all of North East Asia, Southeast Asia, Europe, the Middle East, and much of Africa could be at additional risk to missile and WMD strikes or coercion.

2) This threat poses unprecedented challenges for U.S. strategy.

Proliferation poses both *direct* and *indirect* threats, each of which could be severe. The near term direct threat to Western military forces and urban centers is the most obvious: Western expeditionary forces will confront opponents capable of striking rapidly at cities, seaports, airports, forward bases, and troop concentrations with nuclear, chemical, and biological weapons. Consequently, WMD and missile proliferation could undermine the West's capacity to form coalitions and mount power projection operations at an acceptable level of risk, and thus undermine the West's capacity to respond to regional aggression when necessary.

The *indirect* threat posed by proliferation involves the effect the possibility of WMD strikes would likely have on Western leaders' decision-making concerning regional crises. In the future, Western and international military operations that have been considered reasonable options, such as U.S. leadership in *Desert Shield* and *Desert Storm*, British recovery of the Falkland Islands, French support for Chad against Libya, or NATO air operations in Bosnia, could become too dangerous to be considered politically acceptable. Consequently, the presence of missiles/WMD, and *possibility* of their use, could deter the West from projecting power in response to regional crises.

3) Traditional nonproliferation measures may be ineffective against this growing threat.

Deterrence

The countermeasure to proliferation most frequently suggested is the application of the traditional policy of deterrence. There are, however, many differences between the East-West Cold War deterrence relationship and any potential deterrence relationship with proliferant states. These differences are very likely to render deterrence *less* reliable. The re-emergence of deep-seated religious and ethnic conflicts, for example, suggests that the mutual deterrence and restraint of the Cold War may not hold in future crises. These types of conflicts frequently do not lend themselves to moderation in objectives or means. Mutual familiarity and a basic level of communication are essential ingredients to the establishment of a deterrence relationship that "works" predictably. In the post Cold War environment, however, the increasing number of proliferant countries that may need to be deterred, and the general lack of knowledge, understanding and empathy for their leaders (most recently illustrated with regard to Saddam Hussein) must reduce the confidence that the West can place on policies of deterrence. Deterrence will continue to be critical in some cases, but is likely to be irrelevant or unworkable in others.

Diplomacy

Traditional national and multinational nonproliferation measures to prevent the spread of technology, materials and systems, such as the Missile Technology Control Regime (MTCR), frequently are presented as the key to addressing the proliferation problem. A charge leveled against TMD deployment is that it would undermine such diplomatic nonproliferation measures.

To a considerable extent, however, the worldwide proliferation of WMD and missiles already has occurred; the "genie is out of the bottle." In addition, any attempt to control missile exports will encounter the "dual use" problem. That is, missile technology intended for peaceful civilian purposes can be adapted for military use. The MTCR recognizes this problem and places restrictions on both.

Nevertheless, efforts by industrialized countries to control the proliferation of ballistic missiles and WMD are becoming increasingly difficult as the

trade in technology and systems within the developing world increases. There is a new factor which threatens to accelerate the pace of uncontrolled proliferation: the collapse of the Soviet Union. There are numerous reports in the Russian press of illegal proliferation activity, scientists lured to working in other countries and outright theft of military equipment.

While technology and export controls may help delay and increase the costs of the proliferation of missile technologies, ultimately they are not adequate alone to address the threats posed by proliferation, nor can they offer useful guidance *following* proliferation.

4) Ballistic missile defenses provide unique contributions to U.S. nonproliferation and counterproliferation policies.

There are significant potential nonproliferation and counterproliferation roles for TMD. First, and most obviously, when deterrence fails, TMD could provide *unique* protection against the subsequent use of WMD-armed ballistic missiles.

Second, the political benefits of TMD could be significant, particularly for countering proliferation. In the absence of missile defense, the United States could find itself paralyzed from responding forcefully to extreme proliferation problems, thereby undercutting the credibility of U.S. diplomatic efforts and all military counterproliferation options; missile defense may be critical to U.S. and allied decisions to project power in response to proliferation or aggression by a regional bully.

Rather than undermining diplomatic nonproliferation efforts, effective TMD should contribute to traditional nonproliferation measures. TMD could contribute significantly to nonproliferation by undermining the military and political utility that many proliferant states attribute to missiles, thereby reducing the incentives to acquire, market, or maintain missiles.

5) The U.S. missile defense program has been structured to provide highly effective defense against *theater* missile threats.

To support U.S. counterproliferation efforts, the Department of Defense has developed a TMD

program to counter the existing and emerging theater ballistic missile threat. The TMD program consists of three sequential efforts: near term initiatives that consist of relatively inexpensive upgrades to existing air and missile defense systems; Core TMD systems that will provide substantially increased capability against the emerging threat; and advanced TMD programs to prepare for the emergence of more sophisticated threats.

6) Footprint analysis, as used by critics, provides a misleading assessment of the capability of the U.S. TMD systems.

Although the TMD program has been structured to provide capabilities against theater range ballistic missiles, now and into the future, concerns have been raised about the capabilities of systems such as THAAD, and their potential ability to intercept *strategic* ballistic missiles. Footprint analysis is presented as evidence of THAAD's prospective significant capabilities against strategic RVs. That is, critics of the Administration's program estimate the geographical area that could be defended by THAAD and compare that to the area that could be defended by a strategic defense system, (i.e., they compare "defensive footprints"). Defensive footprints are compared to suggest that under the Administration's plan, THAAD would have significant capability against strategic missiles, and allow no meaningful "firebreak" between highly capable theater defenses and strategic defense systems, thereby undermining the ABM Treaty.

This key argument is vulnerable on two grounds, first in its use of footprint analysis to "prove" the point, and second, in its estimation of likely U.S. TMD capabilities. A footprint is a theoretical construct of the area on the ground that a specific system could defend against a specific threat in a "one-on-one" engagement where the full capability of the system is directed against only a single target and full account rarely is taken of the many factors that degrade the performance of the defense. Nor does footprint analysis take account of measures to degrade defensive system performance that are under the control of the attacker. In short, the use of a footprint to determine ABM capability is flawed because its size is highly dependent on variables that may not be controlled.

7) The Core U.S. TMD Systems do not provide strategic capability.

The significance of U.S. TMD systems in a strategic defense role is quite limited from an operational point of view. The PAC-3/ERINT program has no operational capability against strategic ballistic missiles. THAAD, a subject of concern to some, has no significant operational capability against a modern strategic ballistic missile and re-entry vehicle. Against such a combination, THAAD has little or no capability to defend itself, though some footprints can be discerned against some modern systems. Consequently, it hardly is a system in which reliance can be placed to absorb either a retaliatory strike or a first strike, even at the lower level of offensive forces contemplated by START II. Moreover, the combination of tactics and countermeasures easily within Russia's capacity would further degrade THAAD's performance. The Navy Lower Tier system shares PAC-3's basic limitations against strategic missiles. The performance of any TMD system can be improved by altering their radars performance or by providing them with information from space-based sensors. But the basic design of the Core systems does not free them from their radars, leaving both vulnerable to strategic countermeasures within Russia's capacity. And, in the case of the Navy Lower Tier, it can provide defense for targets that are relatively close to the location of the ship. As a result, it has no ability to provide an effective strategic defense of the U.S.

In summary, while concerns have been raised about the ability of U.S. TMD elements to provide strategic capabilities, the operational and technical characteristics of the systems as they have been designed, do not pose any significant capability against strategic ballistic targets.

It would appear that the positions being taken by some critics of the Administration could result in forcing the Administration and the Congress to choose between effective TMD and the ABM Treaty. In our view, forcing such a choice is not necessary.

8) The Clinton Administration's announced Demarcation proposal for permitting TMD testing against targets with maximum reentry velocities of 5 km/sec and use of the demonstrated standard for determining capabilities are completely consistent with the ABM Treaty.

In 1972, the United States and the Soviet Union were not worried about theater ballistic missile threats from Third World countries. Limitations in the Treaty are designed to preclude the upgrading of Soviet surface-to-air missiles (SAM). Specifically, Article VI(a) prohibits the parties from giving non-ABM components—interceptors, launchers, and radars—the "capabilities to counter strategic ballistic missiles or their elements in flight trajectory," and prohibits testing non-ABM components or systems "in an ABM mode." To assure U.S. compliance with these important testing guidelines, then Director of Defense, Research, and Engineering John Foster issued the following Department of Defense guidance for U.S. tests requiring compliance review: any test against a ballistic missile whose velocity exceeded 2 km/sec or altitude was over 40 km would require prior approval. This guidance, which became known as "the Foster Box," was not an agreed-upon dividing line between strategic and tactical missiles, and it was never formally discussed with the Soviets. Today, this Foster Box no longer reflects the realities of ballistic missile technologies: current theater ballistic missiles travel at velocities up to 5 km/sec—the Clinton Administration's proposed "Demarcation" line—and most modern strategic ballistic missiles have reentry velocities of 7 km/sec or more. This allows for a 2 km/sec buffer between theater and strategic ballistic missiles which could be verified by national technical means (NTM). This is an important point because NTM alone are the basis of the ABM Treaty verification regime, and the determination of ABM capabilities for Treaty purposes is based on demonstrated capabilities verifiable by NTM.

The Clinton Administration's Demarcation agenda of permitting TMD tests against theater ballistic missiles with ranges up to 3,500 km and maximum velocities of 5 km/sec, and utilizing the demonstrated standard for determining capabilities to counter ballistic missiles, are completely consistent with the intent and terms of the Treaty and its verification regime.

Critics of the Administration now argue against the demonstrated standard on the grounds that it could permit U.S. TMD systems some inherent strategic capability. Ironically, some of these same critics embraced the demonstrated standard in the past when challenging U.S. Treaty concerns about the strategic potential of some Soviet SAMs.

9) Suggestions that Demarcation issues can be settled "for now" and reopened later, should the need arise, may ignore serious constraints on any future Treaty adjustments.

In December 1993, the Clinton Administration announced its acceptance of "multilateralization" of the ABM Treaty, and directed that negotiations begin on "procedures to implement a multilateral succession." In this regard, the United States has announced that "it is willing to accept as Treaty Parties any of the New Independent States (NIS) [i.e., of the former Soviet Union] that want to be Party to the Treaty." If the multilateralization process proceeds, future changes on the subject of Demarcation or other possible Treaty issues that may arise, could become non-negotiable. Consequently, suggestions that questions of Demarcation can be settled "for now," and reconsidered in the future as might be necessary, run the risk of incorrectly assuming that further adaptation of the Treaty to changing conditions will be readily negotiable. In the context of the fast pace of proliferation and the increasing lethality and range of the theater missiles that are proliferating, "settling" now for TMD capabilities that are likely to be insufficient in the foreseeable future, could lock the United States into restrictions soon to be onerous but not easily undone.

INTRODUCTION

One of the prominent features of the post-Cold War international order is the proliferation of weapons of mass destruction (WMD), including nuclear, chemical, and biological weapons, and the proliferation of ballistic missiles capable of delivering those weapons. Of particular concern has been the emergence of *theater* missiles in countries hostile to the United States, such as North Korea, Iraq, Iran, and Libya. Given this emerging missile threat to U.S. allies and forces deployed abroad, the Ballistic Missile Defense Organization has been directed by the Clinton Administration to focus its primary efforts toward "developing deployable advanced theater missile defenses to protect U.S. forward-deployed forces, allies, and friends [as] an important element of the Counterproliferation Initiative" [2].

A consensus is developing among the NATO allies, the Western European Union, Israel, the Russian Federation, Japan, South Korea, Sweden and others that missile defense is a necessary part of the response to proliferation [3]. A complicating factor, however, is that the U.S.-Soviet ABM Treaty of 1972 strictly limits U.S. and Russian defenses against long-range *strategic* missiles, without providing a precise Demarcation line separating strategic defenses from defenses against shorter-range *non-strategic* theater missiles—the type of missiles now spreading in the developing world [4]. In short, although defenses against theater-range missiles intentionally were not limited by the ABM Treaty, there is no clear mutually-agreed way of determining at what point effective defenses against shorter theater-range missiles undermine the intent and terms of the ABM Treaty.

Consequently, the Clinton Administration is addressing the issue of how it can continue to abide by the ABM Treaty—a Treaty for which it has declared strong support—and simultaneously pursue the "highly effective theater missile defenses" (TMD) necessary for counterproliferation purposes. The Administration has proposed to Russian negotiators a clarification of the ABM Treaty in the Standing Consultative Commission (SCC) which

would permit each side to deploy TMD systems in a manner consistent with the intent of the Treaty. Under the Administration's proposal, any system actually tested against a ballistic missile traveling at greater than 5 km/sec would be considered a *strategic* missile defense system, and therefore, strictly controlled by the ABM Treaty. Until such a test occurs, defensive systems would not be considered strategic and pertinent to the Treaty. That is, the demonstration of a defensive capability by testing against a target traveling at greater than a 5 km/sec threshold would be the "Demarcation" line between *non-strategic* and *strategic* ballistic missile defenses, the latter continuing to be limited by the ABM Treaty.*

Most modern strategic ballistic missiles have reentry velocities of 7 km/sec or more. Consequently, the Clinton Administration's proposed 5 km/sec threshold permits a 2 km/sec margin between theater and strategic ballistic missiles. This provides the significant advantage of being verifiable by national technical means [5].

The Clinton Administration's ABM Treaty Demarcation negotiating agenda has encountered vigorous opposition from some members of the unofficial "arms control community." This is despite the fact that it is intended to maintain the agreement's relevance by clarifying and updating a 22-year-old Treaty in light of rapidly changing conditions. Those emerging conditions that have led the United States and Russia to seek clarification of the Treaty include the proliferation of ballistic missiles and weapons of mass destruction, advances in defense technologies, and the dissolution of the former Soviet Union.

THE CRITICS' CHARGES

Harsh criticism of the Administration's position on ABM Treaty Demarcation has been voiced by the traditional nongovernmental arms control community. This opposition seems curious at first glance, given that the Clinton Administration, in contrast to the previous Bush and Reagan Administrations, has repeatedly expressed a strong commitment to the ABM Treaty. Nevertheless, the Arms Control Association, for example, has

*Because the proceedings of the SCC are confidential, this study focuses on those elements of the discussions that have been made public.

presented a number of arguments against the Clinton Administration's TMD program and Demarcation proposals [6]:

1) The administration has accepted as serious a non-existent threat (i.e., the proliferation of ballistic missiles) in order to justify its proposed TMD system: since the United States pursued its foreign policies during the Cold War without any missile defense whatsoever, despite the threat of thousands of Soviet nuclear weapons, why would theater missile defense be needed against "minor adversaries?" Deterrence, it is suggested, can address any prospective missile threat, as it did during the Cold War. As Spurgeon Keeny, Executive Director of the Arms Control Association, observes in this regard, "[T]he administration has embraced the dubious concept of the 'undeterrable' state. But even fanatical, paranoid regimes are deterred by the prospect of catastrophic consequences" [7].

2) The focus on TMD is an example of an increased emphasis on counterproliferation which suggests that the Nuclear Nonproliferation Treaty (NPT), the Missile Technology Control Regime (MTCR), Chemical Weapons Convention (CWC), and other forms of diplomacy are ineffective in stemming proliferation.

3) Proposed U.S. TMD systems, under the Treaty Demarcation proposal, would have significant ABM capabilities; therefore defining the ABM Treaty to permit their development, testing, and deployment would eviscerate the intent and purpose of the Treaty.

This report addresses these and additional arguments that have been presented in opposition to the Clinton Administration's position concerning the need for TMD and its publicly-announced approach to ABM Treaty Demarcation.

PROLIFERATION: A CONTRIVED THREAT? [8]

The proliferation of nuclear, chemical, and biological weapons of mass destruction (WMD) and advanced delivery systems such as ballistic and cruise missiles is a widely-recognized problem. The

Clinton Administration has identified proliferation as one of the four primary threats confronting the United States in the post Cold War era [9]. NATO, the Western European Union (WEU), the Russian Federation, and Japan also have expressed mounting concern about the danger posed by proliferation [10]. According to the Central Intelligence Agency (CIA), "the potential capabilities of some countries are comparable to, and in some cases, more lethal than the 1960 Soviet threat" [11].

While it is difficult to know exactly how many countries may have, or are developing WMD, official U.S. intelligence estimates suggest that at least 25 countries may be developing such weapons and delivery systems for their use [12]. Informed estimates suggest that currently, 24 countries have chemical weapons programs in various stages of development [13]; about 10 countries have biological weapons programs in various stages of development [14]; and at least 10 countries reportedly are interested in nuclear weapons development [15].

Coupled with WMD proliferation is the expansion of the numbers of countries armed with ballistic missiles. At least 12 developing countries have "Scud class" or better systems (ranges of approximately 300 km and greater). Of particular concern are those missile programs in Iran, Syria, Libya and especially North Korea. The most prevalent missiles among these proliferant countries are the Soviet-made Scud-B, with an approximate range of 300 km, and longer-range derivatives. More worrisome, however, is the development of new, longer-range missiles. For example, North Korea has successfully flight-tested the 1000 km *Nodong-1*, and Libya continues to work on the new solid-propellant *Al Fatah*, a 950 km range missile [16].

Also of particular concern are North Korean efforts to sell the *Nodong-1*—which is capable of carrying conventional and WMD warheads—on the international market [17]. North Korea has pursued sales of these missiles to countries hostile to the United States, including to Iran [18]; Libya too is anxious to acquire North Korean missiles [19]. If Iran and Libya do purchase the *Nodong-1*, cities in Russia, Italy, Greece, and Turkey will be under the potential threat of Iranian or Libyan WMD.

The table below provides a summary of missile systems currently owned, or in development among developing countries.

Developing countries are becoming adept at modifying and increasing the range, accuracy and lethality of missile systems. Recently, U.S. intelligence officials have confirmed that North Korea is developing two new missiles [20], the so-called *Taepodong-1* and the *Taepodong-2*. Unofficial public estimates suggest that the *Taepodong-1* may have a range of 2,000 km and the *Taepodong-2* a range of from 3,500 km to 9,600 km [21]. If countries such as North Korea, Iran and Libya ultimately possess *Taepodong-2* missiles, all of Northeast Asia, Southeast Asia, Europe, the Middle East, and much of Africa could be at additional risk to missile and WMD strikes or coercion [22]. According to the Director of Central Intelligence, Mr. R. James Woolsey, when deployed in North Korea these

missiles will threaten much of the Pacific Region, including U.S. military bases, and "even most of Russia" [23].

Then-Japanese Prime Minister Kiichi Miyazawa labeled the prospect of North Korean missiles and WMD a "grave concern" [24]. It led to comments by senior Japanese officials about the once-unmentionable—Japanese development of nuclear capabilities. On July 28, 1993, for example, Japanese Foreign Minister Kabun Muto observed that North Korean programs could compel the Japanese to have the will to build nuclear weapons if necessary:

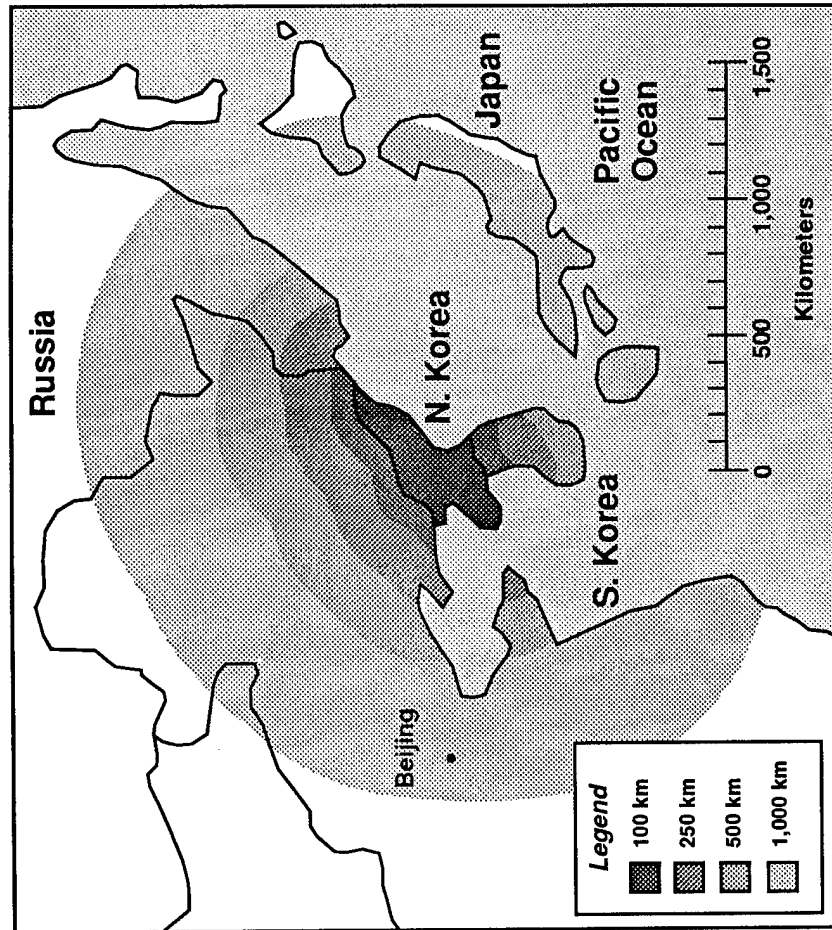
If North Korea develops nuclear weapons and that becomes a threat to Japan, first, there is the nuclear umbrella of the United States upon which we can rely. But if it comes down to a crunch, possessing the will that 'we can do it' is important [25].

Missile Capabilities of Select Developing Countries [26]

Short-Range Missiles		Medium to Long Range Missiles	
250km to 600km	Afghanistan (Scud-B) China (DF-15, DF-11) DPRK (Scud-B, Scud-C) Egypt (Scud-B, •Project T) India (Prithvi-2, •Prithvi-3) Iran (Scud-B, Scud-C) * Iraq (Scud-B, Al Hussein) Israel (YA-1) Libya (Scud-B) Pakistan (•Hatf-2, ~M-11, •Hatf-3) ROK (NHK-1) Syria (Scud-B, Scud-C, ~M-9) Yemen (Scud-B)	1000km to 2000km	China (DF-21/JL-1, DF-25) DPRK (•Nodong 1, •Nodong 2) Iran (•Tondar 68) Israel (YA-3) S. Africa (•Arniston)
		2000km to 5000km	China (DF-3, DF-4) DPRK (•Taepodong-1, •Taepodong-2) (?) India (•Agni) * Iraq (•Al Abid) Saudi Arabia (DF-3)
>600km	Argentina (•Condor II) * Iraq (Al Abbas) Libya (•Al Fatah) Taiwan (•Tien Ma)	>5000km	China (DF-5, •DF-31/JL-2, •DF-41) DPRK (•Taepodong-2) (?)

~ Status uncertain • Potential * Prohibited

DISTANCES FROM NORTH KOREA



Courtesy of the Ballistic Missile Defense Organization

The concern expressed by Japanese officials noted above should not come as a surprise. A small number of North Korean missiles and WMD could place the vast majority of the Japanese population and industry at risk. With the North Koreans recognized as already likely to have extracted enough plutonium for one nuclear weapon [27], and on the verge of the potential to build four or five more [28], the Japanese leadership must recognize that nonproliferation efforts may fail vis-a-vis North Korea, and begin considering the various options available to counter this threat. This, of course, is one of the dangers associated with proliferation: the acquisition of WMD and missiles by one regional power compels its neighbors to seek comparable arms, unleashing a "chain reaction" of regional proliferation.

Recognition of the dangers posed by proliferation worldwide is one reason why the Clinton Administration has emphasized counter-proliferation as a priority goal.

A Real Threat: Implications of Proliferation for International Stability

In the war with Iraq, 25% of U.S. combat fatalities were the result of a single Scud missile striking a makeshift American barracks in Dhahran, Saudi Arabia. This was the first dramatic demonstration to most Western audiences of the dangers posed by proliferation. In future regional crises, Western political leaders will be confronted with regional opponents capable of threatening and using missiles armed with WMD. When this occurs, Western leaders will be compelled to consider the possibility that military and civilian casualties will be on a scale far greater than those involved in any conflict since World War II. This threat stems not from the spread of nuclear weapons alone, but also from the spread of chemical and biological weapons, and the means to deliver those weapons reliably at long range [29].

Direct and Indirect Threats

Proliferation poses both *direct* and *indirect* threats, each of which could be severe. The near term direct threat to Western military forces and urban centers is the most obvious. Unless countered, the proliferation of WMD and delivery means will introduce an unprecedented situation: Western

expeditionary forces will confront opponents capable of striking rapidly at cities, seaports, airports, forward bases, and troop concentrations with nuclear, chemical, and biological weapons. This emerging capability may be particularly important given recent developments suggesting an extreme U.S. reluctance to pursue foreign policy options involving the potential for large numbers of military or civilian casualties [30].

Consequently, WMD and missile proliferation could undermine the West's capacity to form coalitions and to mount power projection operations at an acceptable level of risk. This would challenge the West's capacity to respond to regional aggression when necessary.

The military significance of such a development for the international order perhaps is best understood by considering whether *Desert Shield* or *Desert Storm* would have been feasible had Saddam Hussein used missiles and WMD to strike the sea and airports used by Coalition forces. Clearly, the six-month buildup of Coalition forces to protect Saudi Arabia and subsequently to liberate Kuwait would have been extraordinarily risky, perhaps impossible, in the face of WMD strikes on regional airports, seaports, and troop concentrations.

World War II provides an early example of how missiles in the hands of an aggressor could have had disastrous consequences. The German development of missiles during World War II posed a potential threat to allied expeditionary forces. Commenting on the German V-1 and V-2 missiles, the Supreme Allied Commander of World War II, Gen. Dwight D. Eisenhower, noted soon after the war that, "It seemed likely that, if the German had succeeded in perfecting and using these new weapons six months earlier than he did, our invasion of Europe would have proved exceedingly difficult, perhaps impossible. I feel sure that if he had succeeded in using these weapons over a six-month period, and particularly if he had made the Portsmouth-Southampton area one of his principal targets, Overlord might have been written off " [31]. This type of missile threat *will* exist within the foreseeable future in most regions where Western expeditionary forces might realistically be needed, and that threat will be magnified by the likely presence of WMD.

The direct threat, however, will not be limited to possible strikes against Western expeditionary forces. If North Korea continues its international marketing of missiles, especially to the Middle East, close and even distant neighbors of Libya, Iraq, Iran, and North Korea may face the possibility of WMD strikes against their urban centers in the foreseeable future. The impact of such a direct threat on civilians and political leaders, even if the threat involves "only" chemical weapons and crude missiles, can be understood in part by reference to the tremendous strain Israel confronted when its urban centers were under attack by Scud missiles and the *possibility* of Iraqi chemical warheads. Actual chemical strikes against unprotected civilian centers could involve enormous casualties. Missile strikes involving nuclear or biological warheads could devastate civilian centers even following any hasty civil defense measures [32].

The *indirect* threat posed by proliferation involves the effect that the possibility of WMD strikes would likely have on Western leaders' decision-making concerning regional crises. In the future, Western and international military operations that have been considered reasonable options, such as U.S. leadership in *Desert Shield* and *Desert Storm*, British recovery of the Falkland Islands, French support for Chad against Libya, or NATO air operations in Bosnia, could become too dangerous to be considered politically acceptable. Even the humanitarian use of military force, such as that conducted under the auspices of the U.N. in Somalia could be considered too risky if it might provoke a party armed with WMD.

Again, the significance of a proliferant state's potential to constrain Western decision-making so dramatically may be understood by consideration of the Coalition war with Iraq. If Iraq had been capable of threatening Washington, London, Paris, and Rome, with WMD, it may have been able to deter any forceful response whatsoever to its invasion of Kuwait.

The West has in the past been willing and capable of projecting power when necessary in response to regional aggression. In the future, proliferation could sharply constrain the West's freedom of action, leaving regional bullies and aggressors a free hand. This would have a disastrous effect on U.S. allies and friends who confront

powerful neighbors, and would significantly undermine the West's capability and will to protect Western regional interests.

Concern that proliferation could undermine both the West's capability and will to respond to regional aggression and crises is not speculative. This value of ballistic missiles and WMD is well appreciated by the political and military leaders of proliferant states. Some of those leaders openly state that missiles and WMD are critical for enabling them to hold regional opponents and Western powers at bay, while pursuing their regional goals [33].

It should be noted that establishing such a deterrent/coercive capability would not necessitate that a proliferant state actually be willing to initiate a WMD attack on Western cities. Rather, the mere *possession* of missiles and WMD by regional aggressors will compel Western leaders to consider the risk to their civilian centers—with the consequent inhibitions on the foreign policy options they can consider acceptable.

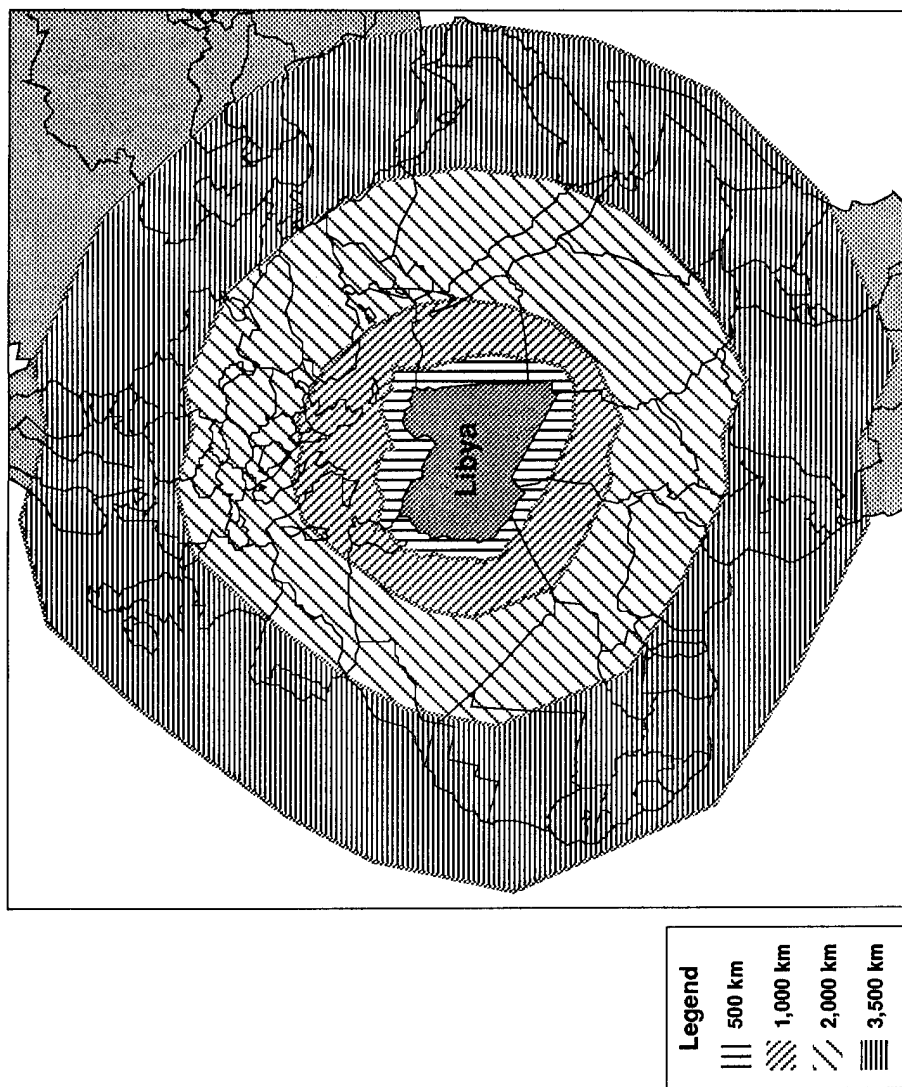
TRADITIONAL NONPROLIFERATION MEASURES: DETERRENCE AND DIPLOMACY INSTEAD OF TMD?

There is little doubt that missile and WMD proliferation warrant a serious response. A question that must be addressed, therefore, is the appropriate set of countermeasures. Should TMD be an element in efforts to counter proliferation?

Deterrence?

The countermeasure to proliferation most frequently suggested is the application of the traditional policy of deterrence [34]. Most recently, the assertion that nuclear deterrence worked during the Cold War, and will continue to work reliably against proliferant states has been raised as a reason to oppose the Clinton Administration's plan to deploy TMD [35]. If it is possible to deter proliferant states with confidence, why spend the resources necessary to defend against the threat?

DISTANCES FROM LIBYA



Courtesy of the Ballistic Missile Defense Organization

There are, however, many differences between the East-West Cold War deterrence relationship and potential deterrence relationships with proliferant states. These differences are very likely to render deterrence less reliable vis-a-vis proliferant states than it appears to have been during the Cold War [36].

The re-emergence of deep-seated religious and ethnic conflicts, for example, suggests that the mutual deterrence and restraint of the Cold War may not hold in future crises. These types of conflicts frequently do not lend themselves to moderation in objectives or means. This is not simply a Western concern, a prominent Russian military expert, Gen. Mikhail Vinogradov, recently observed:

The events in the Persian Gulf have shown that the presence of totalitarian regimes in certain countries, ethnic and religious strife both between the peoples of several states as well as inside them can lead and have already led to armed conflict and even war. Wars of such a nature belong to the category of unpreventable because in these cases the system of global nuclear deterrence does not work [37].

The East-West deterrence relationship was predicated on an assumption that leaders would make decisions based on predictable calculations of expected gains and losses. Each side was assumed, ultimately, to be guided by a basic level of moderation—that is, neither would "risk everything" in confrontation with the other. Leaders also were assumed to understand the opponent's will, goals, values, capabilities and levels of tolerance, and to act upon that understanding.

Mutual familiarity and a basic level of communication are essential ingredients to the establishment of a deterrence relationship that "works" predictably. As several academic experts have rightly noted about deterrence, "If one does not issue the right threat to the right target, for the right reasons, in the right way, it may not matter what the threat is" [38]. In the absence of an appreciation of the opponent's will, goals, values, and perception of threat, any suggestion that policies of deterrence can "work" reliably—and therefore that TMD is unnecessary—represents only wishful thinking.

Five decades of close interaction and forty years of practicing nuclear deterrence with the Soviet Union permitted some confidence that deterrence policies could be reliable. The Soviet leadership focused considerable attention on the East-West relationship, there frequently existed numerous channels of communication (imperfect as they were), and a governing motif of Soviet leadership was not to risk much in "adventurous" brinkmanship.

In the post Cold War environment, however, the increasing number of proliferant countries that may need to be deterred, and the general lack of knowledge, understanding and empathy for them (most recently illustrated with regard to Saddam Hussein) must reduce the confidence that the West can place on policies of deterrence. This is not, as some suggest, because leaders of proliferant states should be considered "irrational." Rather, it is because those conditions that render deterrence relatively reliable, i.e., mutual understanding, close mutual attention, communication, and a mutual unwillingness to risk everything for some transcendent goal, are unlikely to pertain reliably to relations with many potential proliferant countries.

Indeed, careful historical studies conclude that leaders in real-world crises frequently are unable to make decisions in the rational, well-informed manner assumed in deterrence theory [39]. In numerous actual crises and wars, misperceptions, ignorance, extreme optimism or pessimism, and surprising modes of behavior frequently have contributed to the outbreak of conflict [40]. This, in addition to some cases of apparent irrationality, appear to have led to war which deterrence *should* have prevented.

The Gulf War provides a recent example of these factors at work, confounding U.S. expectations about Saddam Hussein's behavior [41]. Then-U.S. Ambassador to Iraq, April Glaspie has acknowledged that, "we didn't understand Saddam Hussein" [42]. That lack of understanding led the U.S. to misjudge Saddam's likely behavior. More recently, U.S. Assistant Secretary of Defense, Ashton Carter, has noted with regard to the North Korean leadership, "We don't know how they work all that well. Even if we had more interaction with them, they are an extremely secretive regime" [43].

The problem for deterrence illustrated by such examples is that a reliable policy of deterrence cannot be established: in the absence of mutual familiarity; with an opposing leadership that is willing to accept grave risks; or, with an opponent that sees itself as having no acceptable alternatives to the use of force [44]. These conditions are in addition to the more traditional concerns over whether U.S. nuclear forces, and the credibility of their threat, will be adequate for deterrence in future contingencies.

In short, the very human factors of leaders believing that there are no alternatives to war, or leaders simply making mistakes—based on misperceptions and faulty information about the opponent—have contributed in the past to conflicts that should have been deterred had leaders foreseen the consequences of their actions.

In the post Cold War environment, the conditions necessary for confidence in deterrence almost certainly will not be met in relations with multiple proliferant countries. The United States and numerous proliferant states simply lack the mutual understanding and knowledge necessary for deterrence to be deemed reliable. Consequently, relying on deterrence and foregoing missile defense in response to the proliferation of missiles and WMD—as is suggested by critics of TMD—can only be considered extraordinarily risky. Traditional policies of deterrence will continue to be key in some circumstances, but they cannot be considered a panacea or a basis for rejecting missile defense.

Technology Controls ?

Traditional national and multinational nonproliferation measures to prevent the spread of technology, materials and systems also frequently are presented as the key to addressing the proliferation problem. As noted above, a charge leveled against TMD deployment is that it would undermine diplomatic nonproliferation measures. Such measures include, for example, the Nuclear Suppliers Group, and the 1987 Missile Technology Control Regime (MTCR).

The industrialized countries should indeed focus on international efforts to prevent the dispersion of WMD, missile technology and materials. Such efforts, however, can not alone

address the threat posed by proliferation. To a considerable extent, the worldwide proliferation of WMD and missiles already has occurred, the "genie is out of the bottle." In addition, recent experience with Iraq and North Korea suggests strongly that some proliferant countries will place a sufficiently high priority on the acquisition of WMD and missiles that they will persevere despite the difficulties that multinational nonproliferation measures impose. Such "rogue" countries may be able to find suppliers or develop hard-to-get technologies and materials indigenously. The current dispute over the North Korean missile and nuclear programs may prove to be an example of this perseverance in the area of both nuclear weapons and missiles. For such countries, multinational export control measures can neither prevent proliferation nor provide security following proliferation.

Experience with the existing international effort to control the export of missile technology and materials demonstrates the inadequacy of such efforts. In April 1987, the U.S., Canada, the U.K., France, Italy, West Germany, and Japan announced the MTCR, an agreement to a set of common export policies intended to control the spread of technology that would enable other countries to acquire missiles that could deliver a payload of more than 500 kilograms to more than 300 kilometers down-range. Transfers to be controlled are identified under two categories of items: category I items include complete rocket systems, complete subsystems, and individual rocket stages; category II includes propulsion components, propellants, flight instruments, missile computers and launch support equipment, *inter alia*.

The key problems encountered by the MTCR are inherent in any attempt on the part of supplier countries to control the transfer of technology and materials—to create a type of cartel. For example, it is unlikely that all potential supplier countries (or enterprises) will comply with the restrictions. In the case of the MTCR, some countries unwilling to join are capable of producing ballistic missiles, and are willing to transfer technical know-how, missile technologies, and even complete missile systems to proliferant states [45]. So long as there is a strong demand for missile systems and technology, their export value will encourage some potential suppliers to disregard export controls and supplant

those who do abide by MTCR's limitations. For example, in the past, China has exported complete missiles systems and specifically rejected participation in the MTCR, in part because of the export value of missiles [46]. More recently, China has promised to adhere to some MTCR guidelines, but informally has attempted to link its participation to other contentious political and economic issues [47].

The transfer of missile technology is extremely difficult to monitor. The spread of ballistic missiles generally follows hidden routes that are hard to trace and interdict [48]. And, the transfer of small missile sub-components—requiring only assembly by the user—essentially cannot be verified. Consequently, because the prospects for effective verification are so poor, provisions for the effective enforcement of export controls would be extremely difficult to establish. In addition, the MTCR includes only self-enforcement by each participant—opening the way for rancorous disputes over interpretation and compliance.

Any attempt to control missile exports also will encounter the "dual use" problem. That is, missile technology intended for peaceful civilian purposes can be adapted for military use. Consequently, unless suppliers also refuse to participate in Third Party civilian rocket programs, the problem of "dual use" will be unavoidable. Distinguishing between the development and spread of satellite-launch vehicles (SLV) intended for civilian use and boosters ultimately used for military or terrorist purposes would be near impossible [49]. This is not a trivial concern. India's space launch program, for example, provided the technology and infrastructure for its ballistic missile programs [50]. Similarly, efforts to impose effective controls on chemical and biological warfare agents are hampered by the fact that the equipment and supplies needed to produce these agents are relatively inexpensive, widely available, and also used to manufacture civilian products or support medical research [51]. Medical research facilities can be the foundation of a biological weapons program. Commercial chemical factories can be relatively easily converted to chemical weapons production. In the 1980s, for example, the Iraqis successfully converted pesticide factories to the production of chemical weapons agents [52].

Controls on technology and materials may well have a valuable delaying effect on those countries incapable of indigenous production. They cannot, however, "solve" the problem posed by dedicated proliferant states. Although now largely destroyed, Iraq demonstrated an impressive indigenous missile capability when it tested a three-stage SLV on December 5, 1989; India, Taiwan, South Korea, and Pakistan also appear to have strong indigenous programs [53]. Clearly, the trend is towards increasing numbers of countries able to produce missiles independently of the industrialized participants and MTCR restrictions. Assistant Defense Secretary Carter recently identified the potential problems with export controls, such as the MTCR: "...Export controls alone cannot prevent proliferation" because determined proliferators such as Saddam Hussein can, "home grow their weapons of mass destruction or get them from other countries" [54].

Efforts by industrialized countries to control the proliferation of ballistic missiles and WMD are becoming increasingly difficult as the trade in technology and systems within the developing world increases. While, as in the case of Iraq, Western firms were important sources for missile technology—increasingly other developing countries are sources for missile systems and technology. China and North Korea are prime examples of this trend; China has been a major supplier of the M series of solid propellant missiles, designed to meet the demand for longer-range missiles [55]. And, North Korea is of particular concern in this regard, given its track record of marketing missiles internationally, its financial problems, and its development of longer-range systems such as the *Taepodong-2* [56].

Clouding the issue further, proliferation trends, intentions and capabilities are often difficult to identify. The international community's misjudgments about the scope and progress of the Iraqi nuclear program are instructive, as is Saudi Arabia's very rapid progress from no missile capability to a 2,800 km range system (via purchase of the Chinese CSS-2 in 1987-88 [57]).

There is a new factor which threatens to accelerate the pace of uncontrolled proliferation: the collapse of the Soviet Union. As sources for manpower, materials, and actual systems for both

WMD and missiles, Russia and some of the other former republics of the former Soviet Union could cause an exponential expansion of such capabilities in the developing world. While at present Russia appears firmly committed to the Western non-proliferation agenda, it remains to be seen if Moscow can maintain effective control over the relevant industries and institutions.

The fluid political and economic situation within Russia has already resulted in inadvertent transfers of technology, systems and expertise in several ways. There are numerous reports in the Russian press of illegal activity, scientists lured to working in other countries and outright theft of military equipment. In recent testimony before the House Foreign Affairs Committee, International Security, International Organizations and Human Rights Subcommittee, James Woolsey stated that the rise of organized crime in Russia has led to growing concerns over the illegal transfer of weapons, including nuclear weapons, to hostile states. According to Woolsey:

Russian criminal organizations have created an extensive infrastructure... built on ties to corrupt military, political and law enforcement officials...we cannot rule out the possibility that organized crime groups will be able to obtain and sell nuclear weapons or weapons grade materials as a target of opportunity. We're especially concerned that hostile states such as Iran, Iraq, Libya and North Korea may try to accelerate or enhance their own weapons development programs by attempting to acquire weapons of mass destruction or weapons grade material through organized crime groups [58].

In July, Sergei Stepashin, head of Russia's counterintelligence service, revealed that several North Koreans have been detained in Russia on suspicion of trying to obtain nuclear weapons components. In October 1992, 60 Russian missile scientists were stopped at the Moscow Airport attempting to leave for North Korea [59]. There are reports that missile scientists in Russia may be selling missile and nuclear secrets to the North Koreans via computer mail links, which are very difficult to monitor [60], and in May of 1994, German police seized a shipment of Russian weapons-grade plutonium before it could be received by agents believed to be working for Iraqi leader Saddam Hussein [61].

Under these circumstances, it is likely to prove very difficult to control the proliferation of advanced weapons technologies, particularly given the prospective behavior of Russian organized crime. In the words of Mr. Woolsey, "there's no possibility for diplomacy, demarches, hotlines or summits. These tools have no meaning to groups whose business is the criminal exploitation of individuals and even governments through threats, intimidation and murder" [62].

In summary, diplomatic nonproliferation efforts may be helpful in the future, but ultimately are inadequate alone to address the threats posed by proliferation. Experience with the MTCR and supplier cartels in general suggest strongly that such measures alone cannot provide the solution: they cannot prevent proliferation in all significant cases, nor can they offer useful guidance following proliferation.

Potential Roles For Theater Ballistic Missile Defense: Contributions to Nonproliferation and Counterproliferation

Because a important degree of proliferation already has occurred, an adequate response must now include traditional diplomatic nonproliferation measures, such as the NPT and MTCR, and counterproliferation measures that address the security threats that emerge following proliferation, such as TMD.

There are important potential nonproliferation and counterproliferation roles for TMD [63]. First, and most obviously, if deterrence fails or simply fails to apply in a future crisis, TMD could provide *unique* protection for population centers against the subsequent use of WMD-armed ballistic missiles. This "safety net" against deterrence failure may be extremely important in some potential situations, such as when an opponent is armed with a relatively small arsenal of missiles. TMD, in this case, might provide effective protection for urban areas that otherwise would be vulnerable. It should be noted that the U.S. and South Korea agreed to the delivery of Patriot defenses to Seoul within days of a direct threat from North Korean diplomat, Park Young-su: "Seoul is not very far from here. Seoul will turn into a sea of fire" [64].

In addition to the potential benefit of TMD in terms of lives saved, it may provide important political, military and economic benefits. The political benefits of TMD could, ultimately, be the most significant, particularly for countering proliferation. For example, the capability to defend against missiles may be critical to a U.S. decision to project power in response to proliferation or aggression by a regional bully. In the absence of missile defenses for U.S. forces, the risk of enormous casualties resulting from projecting force abroad could be too high for any President to accept. Consequently, the U.S. could find itself paralyzed from projecting power abroad, or even credibly threatening to project power abroad, if its forces and nearby allied cities are not effectively protected from missile threats.

During the Cuban Missile Crisis, for example, President Kennedy was unwilling to accept the risk of striking at the new nuclear missile sites in Cuba because of the risk that U.S. air strikes might not be successful, and could lead to the launching of surviving missiles. President Kennedy and Secretary of Defense McNamara rejected the air strike option even though it was recommended by the Joint Chiefs of Staff [65]. In the post Cold War period, proliferation is likely to present the United States with numerous possible situations where the decision to use or threaten to use force could be undermined by the threat of retaliation by missiles and WMD. In the absence of missile defense, the United States could find itself paralyzed from responding forcefully to extreme proliferation problems, thereby undercutting the credibility of U.S. diplomatic efforts and all military counterproliferation options. This same difficulty also would confront undefended U.S. allies and potential coalition partners.

The military value of TMD, even against foes with "militarily insignificant" missile arsenals, could also be important. For example, the significance of Scud attacks during the Gulf War was sufficient to divert a substantial amount of the Coalition's war effort to the "Scud hunt." This was the case for critical political reasons, as Iraqi Scuds posed no significant military threat. A lesson learned anew during the Gulf War was that political leaders must respond to attacks against civilian centers, even if those attacks pose only a minor military threat. By diverting the Coalition's war effort, Scud strikes

were of considerable indirect "military significance." In the future, TMD could play a major and unique role in addressing this problem.

The economic impact of "militarily useless" missile threats to civilian centers can also have a severe economic impact. During the Iranian-Iraqi "War of the Cities" for example, Iraqi missile attacks essentially shut down the Iranian war economy as workers sought refuge from the missile threat. Israel faced a similar problem during the early days of the Gulf War as civilians frequently were confined to, or close by, their shelters. TMD protection for civilians could help address this problem.

TMD also could help alleviate potentially destabilizing concerns about surprise missile strikes deep in a country's territory. In a crisis, the threat posed by an opponent's missiles could encourage preemptive or preventive strikes—which could dangerously escalate a crisis. In this case, TMD could help moderate the incentives to engage in preemption. TMD could also serve to increase decision-making time in any consideration of preemptive strikes by reducing the costs of *not* preempting very early in a crisis. By moderating the incentives and perceived need to preempt, and allowing more time to be taken in decisions concerning preemption, BMD could contribute to moderating a crisis that might otherwise escalate quickly.

Similarly, TMD could serve as a relatively benign alternative to offensive retaliation. This too could help "keep the lid on" a conflict—as was seen most notably in Patriot's defense of Israel during the Gulf War.

Third, international cooperation in the area of BMD may serve as a vehicle to improve political relations among states, and thereby help to reduce the likelihood that the normal "friction" of international relations will flare into crises. TMD as a vehicle for broader cooperation may seem far-fetched given the past contentiousness of the U.S.-Soviet dialogue on the issue. It has, however, specifically been emphasized by President Boris Yeltsin and by other Russian officials in their efforts to encourage U.S.-Russian cooperation on missile defense [66]. Along these lines, Dr. Sergei Blagovolin, an internationally-renowned arms control expert with the Russian Academy of

Sciences, has identified cooperation in the area of missile defense as an appropriate means of developing an "infrastructure for cooperation," and a base for "broader military-industrial cooperation" [67]. The suggested role for missile defense, in this instance, is to use cooperation in the area of missile defense as a vehicle for strengthening U.S.-Russian relations across the board, and thereby help contribute to a greater political accord and reduced opportunities for friction to develop.

Prominent Russian arms control experts have commented on the notions, raised by U.S. critics of TMD, that U.S. and Russian TMD programs might reduce somewhat each side's *strategic* nuclear capabilities against the other, and therefore should be avoided. Russian experts have responded that given the radically changed U.S.-Russian political relationship, and the recent initiatives by each side to move away from the strategic nuclear balance of terror, cooperation on effective TMD should not be impeded by such Cold War era concerns [68].

Finally, rather than undermining diplomatic nonproliferation efforts, effective TMD should contribute to traditional nonproliferation measures. Because TMD will constitute a unique means of counterproliferation, it could undermine the military and political utility that many proliferant states attribute to missiles, reducing the incentives to acquire, market, or maintain missiles.

There is some historical precedent for suggesting this positive relationship between TMD and diplomatic nonproliferation efforts. For example, in the late 1980s a Middle Eastern country proposed to the U.S. that a "missile-free zone" be established in the Middle East, based on cooperation by the potential parties with the United States in the area of missile defense [69]. More recently, the Russian Federation has proposed an international ban on all theater-range missiles, *in the context of cooperation on missile defense* [70]. U.S. officials also have endorsed a global ban on theater-range missiles. The rationale for integrating missile defense with such a missile ban is that missile defenses would reduce the value of offensive missiles, making them easier to give up under such an agreement, and defenses would provide protection for parties to the agreement against nonsignatories and the possibility of cheating. In short, TMD could both reduce the incentives to acquire or maintain missiles, and help

provide the confidence governments would need to participate in a general agreement to give up the missile option.

Of course, TMD alone cannot provide the solution to proliferation. It is one element, albeit an important element, in a potential set of nonproliferation and counterproliferation measures that includes deterrence policies, strengthened international trade restriction, air defense systems, enhanced customs controls, increased intelligence-gathering activities on proliferant countries, and options for offensive strikes against an opponent's WMD and missile facilities.

Fortunately, there is no necessary friction, and considerable possible synergism, between the pursuit of traditional diplomatic nonproliferation measures and comprehensive preparations to counter the proliferation threat, including TMD. That is, rather than undermining diplomatic nonproliferation measures, TMD and diplomatic efforts can be of mutual benefit. Obviously, to the extent that nonproliferation measures "work", they ease the counterproliferation problem. Counterproliferation measures, including TMD, should contribute to nonproliferation, by reducing the value of, and thus the attraction of, missiles and WMD, and by strengthening the U.S. hand in any hard diplomatic bargaining that might take place between the United States and proliferant states, such as North Korea [71].

THE ABM TREATY AND U.S. PROPOSALS: GIVING TMD TOO MUCH CAPABILITY?

Some members of the traditional arms control community have criticized the Clinton Administration's publicly-announced approach to TMD and Demarcation with the charge that the proposed U.S. TMD program would provide significant *strategic* missile defense capability, and would "thereby completely undercut the basic intent of the [ABM] Treaty" [72]. This section describes the U.S. TMD program as it has been structured and examines the charge that theater missile defense systems may have significant capabilities against

strategic ballistic missiles, thereby undermining the intent of the ABM Treaty.

The U.S. TMD Program

To support U.S. counterproliferation efforts, the Department of Defense has developed a TMD program to counter the existing and emerging theater ballistic missile threat. The TMD program consists of three sequential efforts: near term initiatives that consist of relatively inexpensive upgrades to existing air and missile defense systems; Core TMD systems that will provide substantially increased capability against the emerging threat; and advanced TMD programs to provide a hedge against the emergence of more sophisticated threat systems.

The theater missile threat is highly complex and cannot be countered with any single system. It consists of missiles with varying ranges, payloads, accuracy and flight characteristics. These missiles are deployed in diverse geographic locations and in a range of climates, further complicating the TMD mission. And, as has been noted above, the current trends in proliferation are toward missiles of increasing range, accuracy and lethality. Therefore, the U.S. TMD program has been designed to provide an integrated, flexible and responsive mix of TMD systems that can be available to counter these diverse threats now, and as they emerge.

Near-Term TMD Initiatives

Near-term initiatives are designed to provide U.S. forces with much-needed capabilities for in-theater defense. These are *interim* capabilities, or a "bridge" until the Core TMD program delivers expanded capabilities against the theater threat.

Near-term TMD programs include a basic Marine Corps capability to defend amphibious operating areas (improvements to the TPS-59 Radar, Hawk Missile, and the development of the Air Defense Communications Platform).

Near-term improvements also include continued enhancements to the Patriot (Patriot Advanced Capability Level-2, or PAC-2); improved launch detection capabilities (integration and fusing of data from the Defense Support Program (DSP) satellites, the Air Force's Talon Shield, the Navy's Radiant Ivory, and the Army-Navy Joint Tactical Ground

Station, or JTAGS); and, the Commanders-in-Chief Theater Missile Defense (CINC TMD) Experiments Program, designed to integrate TMD assets into existing CINC exercises.

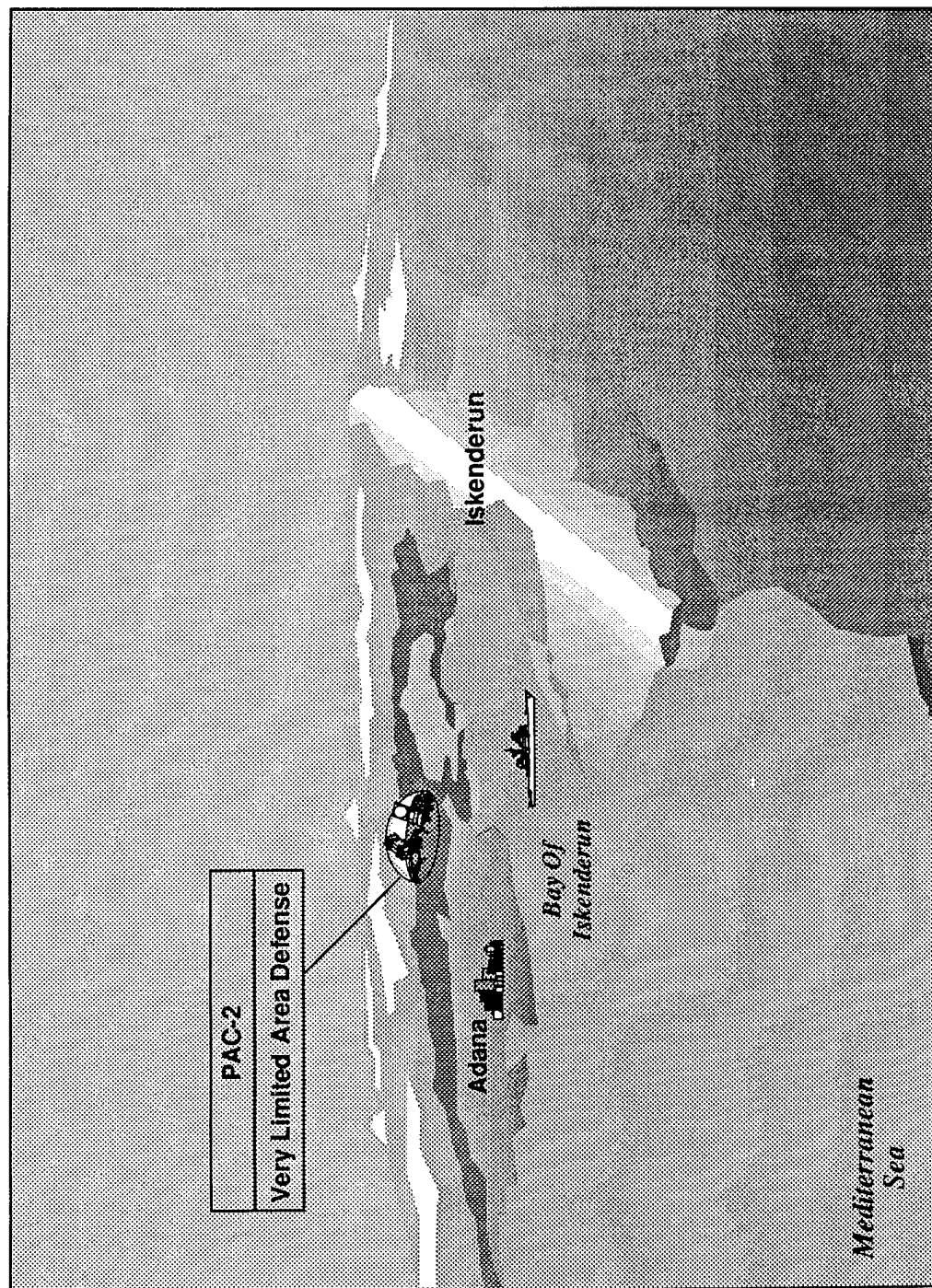
Core TMD Systems

The Core TMD Program consists of five elements, each of which performs a unique and vital function in ensuring the defense of the forces of the U.S., its friends and allies, as well as threatened population centers. These are: the Patriot Advanced Capability Level-3, or PAC-3; the Navy Lower Tier TMD (AEGIS/Standard Missile Block IVA); the Theater High Altitude Area Defense, or THAAD; the Theater Missile Defense Ground-based Radar (TMD GBR); and Battle Management/ Command, Control, Communications and Intelligence, or BM/C3I.

Patriot Advanced Capability Level-3 (PAC-3). Qualitative improvements to the tactical missile threat, beyond the modified Iraqi Scuds, argue for rapid development and deployment of a more capable interceptor against tactical ballistic missiles. The PAC-3 missile defense system will provide greater lethality, range, and accuracy against improved tactical ballistic missiles. The PAC-3 includes an improved fire control radar and interceptor missile, the ERINT.

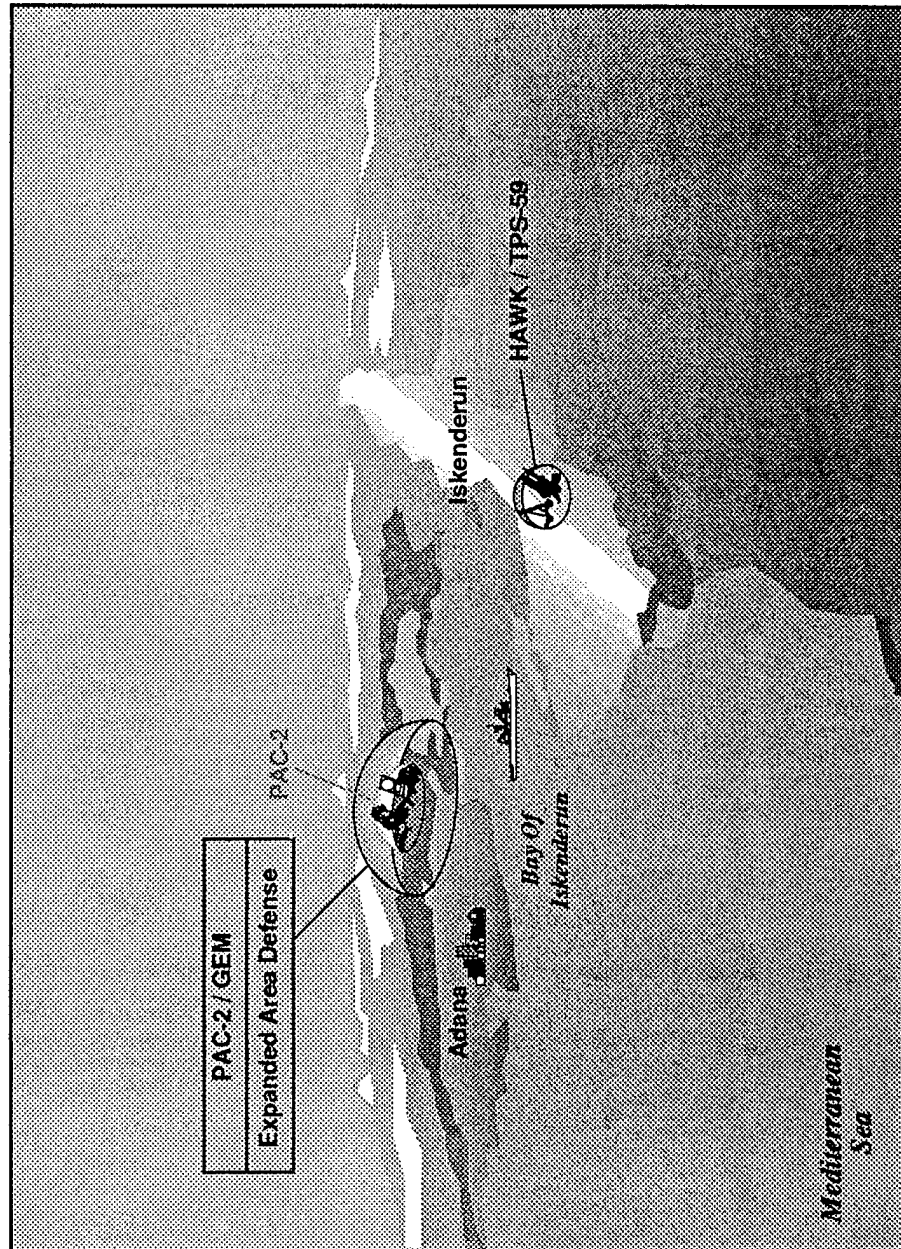
Navy Lower Tier TMD (AEGIS/Standard Missile Block IVA). A naval TMD capability is critical for rapid deployment of defensive capability to provide defense of land-based assets *before* hostilities erupt or before ground-based elements can be transported to the theater. This is particularly true when U.S. forces, friends or allies are operating in areas where the U.S. cannot easily deploy ground-based defenses quickly, or may have to fight their way into a theater. The AEGIS/Standard Missile Block IVA is a collaborative effort between the Navy and the Ballistic Missile Defense Organization to provide a ship-based tactical ballistic missile defense capability, similar to PAC-3. The Standard Missile Block IVA upgrades existing Standard Missiles (currently used for air defense operations), and provides software improvements to the AEGIS radar.

TODAY'S CAPABILITIES (FY 94-95)



Courtesy of the Ballistic Missile Defense Organization

NEAR TERM CAPABILITIES (FY 94-97)



Courtesy of the Ballistic Missile Defense Organization

Theater High Altitude Area Defense (THAAD). THAAD is the most critical element of the core TMD program. THAAD represents the first TMD system which has been designed to counter the existing ballistic missile threat. While all of the other programs are based upon modifications to present systems to deal with many existing tactical and theater ballistic missile threats, THAAD was designed to allow for multiple shot opportunities to intercept threats at longer-range and higher altitude than current systems are capable of addressing.

Multiple shot opportunities, coupled with THAAD's longer-range interceptor, will assure that theater ballistic missiles are neutralized at higher altitudes and farther away from intended targets. This is crucial against missiles carrying chemical, biological or nuclear warheads. High altitude interception destroys offensive warheads at extended ranges from the defended area. Such intercepts help to neutralize dispersed chemical and biological debris, help negate the nuclear blast produced at lower altitudes, and attenuate detrimental nuclear radiation effects against targeted civilian populations.

When deployed with either a PAC-3 or AEGIS/Standard Missile Block IVA as a lower defensive tier, THAAD would represent the centerpiece of an integrated defense of critical areas—capable of meeting both current threats and responding to emerging threats.

Theater Missile Defense Ground-Based Radar (TMD GBR). The TMD GBR is a wide-area defense radar providing surveillance and fire control support for the THAAD missile system and cueing support to lower-tier systems such as PATRIOT. The TMD GBR utilizes state-of-the-art radar technology to provide early warning, threat type classification, interceptor fire control, and launch and impact point estimate. TMD GBR is designed to be capable of performing threat classification against *theater and tactical*, ballistic missiles and warheads, and kill assessment after intercept.

Battle Management/Command, Control Communications and Intelligence. Because the BMDO program is designed to provide integrated U.S. defensive capability and multi-Service interoperability, Battle Management/Command, Control Communications and Intelligence (BM/C3I)

is another key element in the core program. The BM/C3I program is focused on three areas: 1) in-theater dissemination of launch warning information from space-based and other intelligence systems; 2) communications interoperability via the Joint Near Real Time Data Net; and, 3) upgrades to the command and control centers of the Joint Staff and the Services.

The Core TMD Program represents an integrated, interoperable program designed to help defend U.S. forces, allies, and friends. While the Near-Term Initiatives provide some immediate limited defensive capability, the Core Program is designed specifically against the existing and emerging tactical and theater missile threat. The Core Program, therefore, supports the overall U.S. strategy of countering the proliferation of increasingly longer-range ballistic missiles.

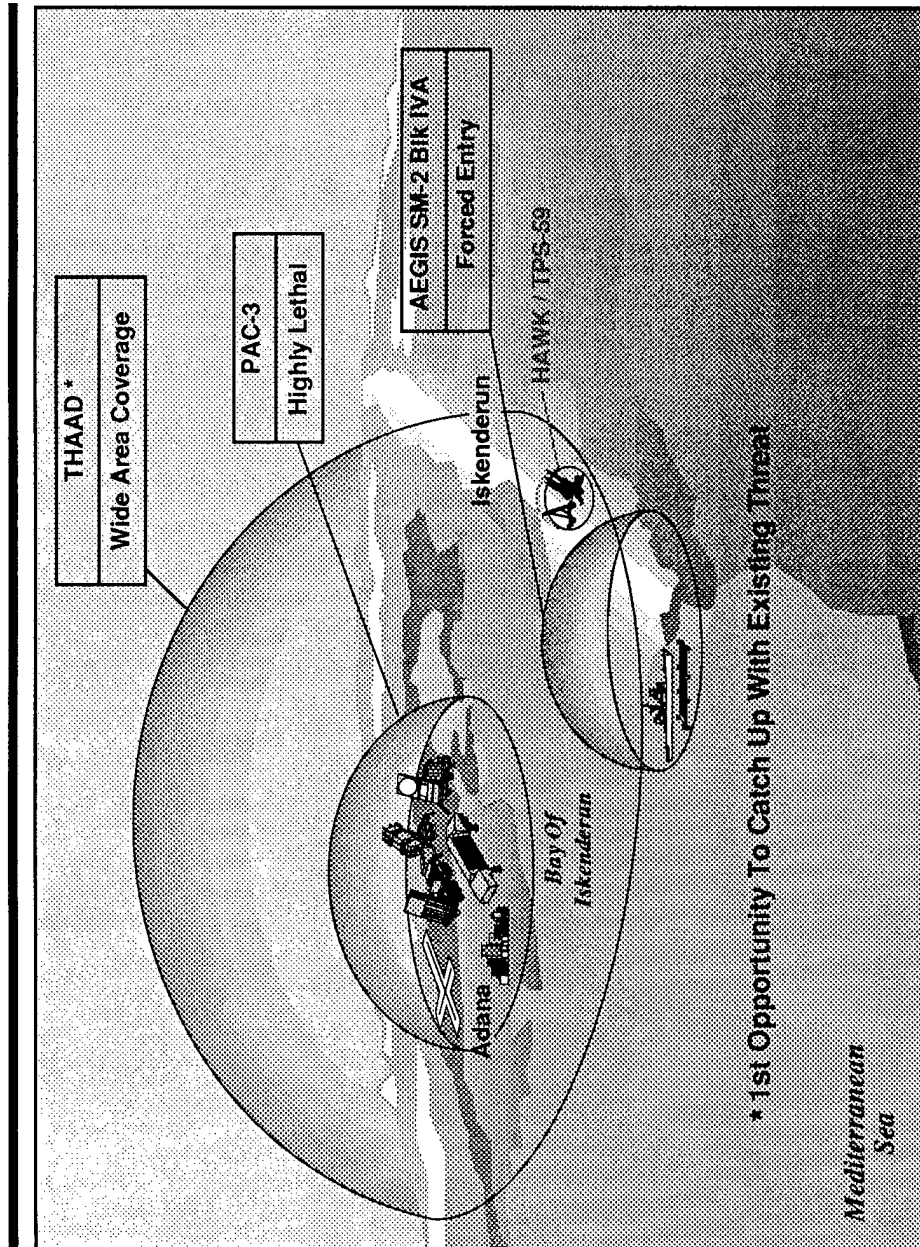
Advanced TMD Capabilities

Included in the overall TMD program are three concept exploration programs and the development of off-board sensors.

The Corps SAM concept is a wide area defense for Army or Marine maneuver forces. This new mobile air and missile defense system is being designed against short-range ballistic missiles and advanced cruise missiles.

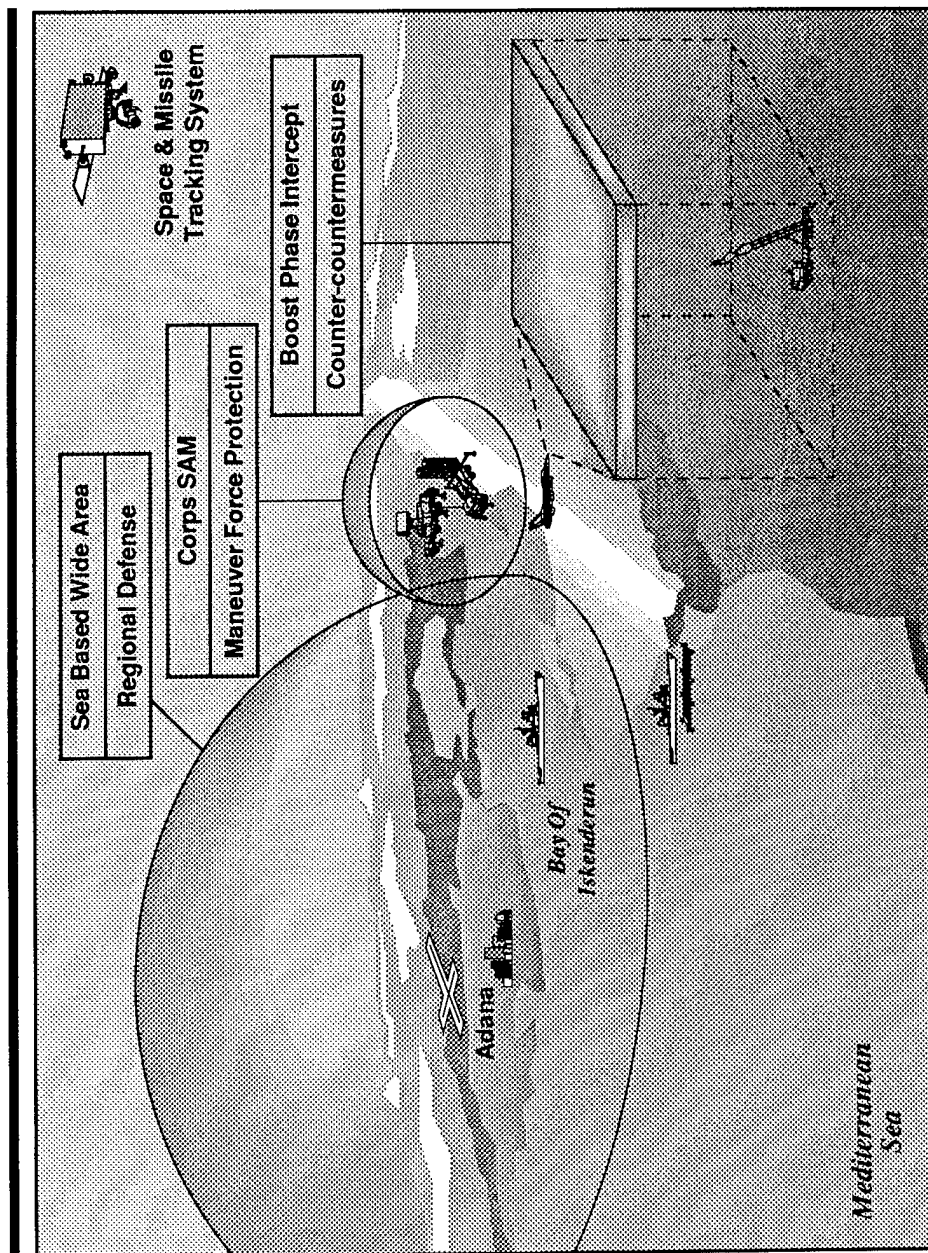
The second of these concepts is the Navy Upper Tier Theater Missile Defense. It would take advantage of the Navy's Vertical Launch System to provide wide-area defense through exo-atmospheric intercept of longer-range theater missile threats. The third interceptor concept is the Airborne Boost Phase Intercept. It can provide the capability to intercept missiles over enemy territory, thereby limiting damage from WMD fallout over allied forces and territory. Maintaining such advanced concepts is critical against a missile threat that is evolving rapidly toward greater range, accuracy and lethality.

MIDTERM CAPABILITIES (FY 97-2002)



Courtesy of the Ballistic Missile Defense Organization

ADVANCED CONCEPTS (FY 2002+)



Courtesy of the Ballistic Missile Defense Organization

The Intent of the ABM Treaty And Theater Missile Defense

TMD systems *per se* are not limited by the Treaty. In 1972, the United States and the Soviet Union were not worried about theater ballistic missile threats from Third World countries. The primary U.S. concern was the Soviet potential for upgrading their extensive surface-to-air (SAM) systems to give them strategic ABM capabilities. Limitations in the Treaty are designed to preclude SAM upgrades. Specifically, Article VI(a) prohibits the parties from giving non-ABM components—interceptors, launchers, and radars—the "capabilities to counter strategic ballistic missiles or their elements in flight trajectory," and prohibits testing non-ABM components or systems "in an ABM mode."

Article VI(a) raises three key, inter-related questions which have taken on increased importance as the United States and Russia strive for effective TMD systems in the 1990s. These are: 1) what are strategic ballistic missiles; 2) what constitutes "testing in an ABM mode"; and 3) how are "capabilities to counter" determined?

In 1972, "strategic ballistic missiles" (ICBMs and SLBMs) in the context of the Treaty were commonly understood by both delegations to be those limited by the SALT Interim Agreement; these included the shorter-range Soviet SS-N-6 and U.S. Polaris SLBMs [73]. The SS-N-6 has a maximum range of 3,000 km and is being phased out of the Russian inventory. The U.S. Polaris missiles have been long gone.

Since the 1970s, significant changes have taken place in the area of international security, including the emergence of theater ballistic missiles with extended ranges and RV velocities up to 5 km/sec. Both Russia and the United States recognize and have agreed upon the need to defend against these real and emerging TBM threats; both countries want to retain the ABM Treaty; and both agree that these two objectives can be met through the on-going negotiations in the SCC.

To assure U.S. compliance with Article VI (a), then Director of Defense, Research, and Engineering John Foster issued the following Department of Defense guidance for U.S. tests requiring compliance review: any test against a ballistic missile whose

velocity exceeded 2 km/sec or altitude was over 40 km would require prior approval [74]. This internal guidance, which became known as "the Foster Box," *was not an agreed-upon dividing line between strategic and tactical missiles, and it was never formally discussed with the Soviets.* Today, this Foster Box no longer reflects the realities of ballistic missile technologies: current theater ballistic missiles reenter at velocities up to 5 km/sec—the Clinton Administration's proposed "Demarcation" line—and most modern strategic ballistic missile RVs have reentry velocities of over 7 km/sec. This allows for a 2 km/sec buffer between theater and strategic ballistic missiles which could be verified by national technical means (NTM).

It is critical to recall that the ABM Treaty is verified by NTM alone. Reliance on NTM was a key consideration in preparing for and negotiating the Treaty; it remains a dominant factor in considering any clarifications, modifications, or amendments to the Treaty. While the Clinton Administration has adopted the "demonstrated capabilities" approach (as is consistent with the use of NTM), some people have proposed determining capabilities based on "inherent capabilities" as derived primarily by footprint analysis.

While simulations or computer projections are useful for design engineers and program managers, the theoretical inherent capabilities derived through use of these simulations cannot be verified by NTM. Furthermore, utilizing simulations or computer projections to determine system capabilities would result in a dual standard: by adopting this approach, the United States would tie its hands without the ability to verify the other Party's simulations of capabilities. In short, the only verifiable means for determining the capabilities of a ballistic missile defense component or system is by demonstrated activities, such as testing in an ABM mode. Indeed, the Senate has adopted a Congressional finding that states that the ABM Treaty does not apply to TMD systems unless such systems are "tested against or have demonstrated capabilities to counter modern strategic ballistic missiles" [75].

The ABM Treaty was intended to be clarified and modified as changing threats and technologies dictated. The last significant clarification of the Treaty was by an Agreed Statement in 1978 which

further clarified "testing in an ABM mode" as used in Article VI (a).

The Clinton Administration has taken a number of actions in its effort to ensure the viability of the ABM Treaty. It has reaffirmed the "narrow" interpretation of the Treaty, and advocated "continued efforts to strengthen" the Treaty during its Five Year Review in October 1993. Presently it is engaged in active negotiations in order to achieve a clarification to the Treaty which will facilitate the development and testing of a TMD capability necessary to meet the real and emerging theater missile threats faced by the United States, Russia, U.S. allies and friends.

The Clinton Administration's proposal for permitting TMD tests against theater ballistic missiles with ranges up to 3,500 km and maximum velocities of 5 km/sec facilitates the development, testing, and deployment of TMD systems to meet these real and emerging theater missile threats. Adopting this Demarcation between theater and strategic ballistic missiles, and utilizing the demonstrated standard for determining capabilities to counter ballistic missiles are completely consistent with the intent and terms of the Treaty and its verification regime.

It has been widely reported that the Russian negotiators in the SCC have proposed that technical constraints beyond the 5 km/sec "Demarcation" line, including a maximum reentry velocity limit on TMD interceptors, be placed on TMD systems [76]. While the reported interceptor velocity limit of 3 km/sec would accommodate the core TMD system, including THAAD, it would not permit more advanced TMD system options which have been proposed by the Navy and Air Force, specifically, the Navy Upper Tier and the air-borne boost phase intercept programs. The Russian proposal is under consideration within the Administration.

Why Footprint Analysis is Misleading

Although the TMD program has been structured to provide capabilities against theater range ballistic missiles, now and into the future, concerns have been raised about the potential capabilities of systems such as THAAD to intercept strategic ballistic missiles. Footprint analysis is presented as evidence of THAAD's prospective significant

capabilities against strategic RVs [77]. That is, critics of the Administration's program estimate the geographical area that could be defended by THAAD and compare that to the area that could be defended by a strategic defense system, (i.e., they compare "defensive footprints") to suggest that under the Administration's plan, THAAD would have significant capability against strategic missiles and would, therefore, allow no meaningful "firebreak" between highly capable theater defenses and strategic defense systems. Consequently, the Clinton Administration's proposal, it is charged, would "effectively eliminate the ABM Treaty as a mechanism for preventing the deployment of defenses against strategic missiles." Based largely on the comparison of "defensive footprints," the Administration's critics conclude that "the options to deploy highly capable TMD systems and to preserve the ABM Treaty appear to be incompatible with each other" [78].

This argument is vulnerable on two grounds, first in its use of footprint analysis to "prove" the point, and second, in its estimation of likely U.S. TMD capabilities.

With regard to assessing missile defense capabilities, two basic methods have been developed. The first is a "component" approach, in which the radar, interceptor or launcher are assessed independently. A second approach is to assess the performance of a system of radars, interceptors and launchers. This is an approach that can be used, for example, when no component seems to be a violation of the Treaty, but when all of the components are aggregated into a system, the result might be a "significant ABM capability."

Neither approach to compliance assessment is required by the Treaty, domestic law or the practices of the organization within the DOD charged with assessing the compliance of U.S. programs with the ABM Treaty, the Compliance Review Group (CRG). The actual basis for determining the compliance of a component or system with the Treaty is the language of the treaty itself, its clear intent, the negotiating record, past practices and the ratification hearings before the Senate.

The provision of the Treaty that is at issue in the context of theater missile defense is Article VI(a). In this case, as for the Treaty as a whole, no guidance

or criteria are provided to define the meaning of this obligation under the Treaty. For example, the Treaty does not define a "strategic ballistic missile" nor does it define "a test in the ABM mode." Nor does the Treaty define, except in the broad terms of Article I, what the "capabilities" are that shall not be given to a "non-ABM system" and when the threshold to an "ABM system" would be breached.

To give some sense of relative capabilities of TMD systems, it has been common practice within the Department of Defense to examine the "footprint" of a candidate system. A footprint is a theoretical construct of the area on the ground that a specific system could defend against a specific threat in a "one-on-one" engagement. It is theoretical because, by definition, the system (and most of its components) will not have actually been tested (because it would not have been known in advance, under current approaches, whether the test would have been compliant). The area on the ground has been used because following the Gulf War, one of the defensive characteristics most avidly sought was the capacity to defend a large area—specifically a city and its population—with the fewest possible deployed units against the full range of threats a TMD system might face.

A defensive footprint defines the area that theoretically could be "defended" not "protected." The distinction is an important one. A defended area is one in which an intercept opportunity might occur; it is not the area in which the defender could be confident of destroying any incoming warhead and hence of actually protecting the people and property within the defended area. For most systems, there is a drop-off in effectiveness as the system reaches its limits in performance. Clearly, for systems in which the premium ultimately is on protecting people and property, efforts will be made to minimize the drop-off in capability, otherwise, additional forces will be needed to provide the desired level of protection. But this theoretical construct of a defensive footprint was developed for a "one-on-one" engagement, that is, where the full capability of the system is directed against only a single target and full account rarely is taken of the factors that can degrade the performance of the defense, including:

- environmental effects that can hamper target acquisition;

- delays in identifying a target and locating it in three dimensional space and in time;
- delays in firing an interceptor, errors that can occur in "handing over" the target from the radar to the interceptor;
- the inherent capacity of the interceptor to correct for those errors;
- the lethality of the interceptor itself and the vulnerability—or lack thereof—of the target to the kill mechanisms employed by the interceptor.

Nor does footprint analysis take account of the effects on system performance that are under the control of the attacker. Countermeasures can include one or more of the following:

- simple decoys, to confuse or overwhelm the radars or cause the interceptor inventory to be depleted by causing them to be launched against the decoys rather than the RVs;
- maneuvers in space or the atmosphere, to make intercepts more difficult and to disguise the real object of the attack;
- detonation of warheads at specified altitudes or as a result of a successful intercept to degrade the performance of the radars, interceptors, kill vehicles or command and control system.

Nor does the analysis take account of actual operational factors that can affect the performance:

- varied launchpoints and azimuths;
- multiple targets;
- defense priorities;
- defense doctrines;
- disadvantageous placement of radars and interceptors;
- degradation or loss of equipment due to combat effects, etc.

These factors can further degrade the performance of the system's command and control, radars, interceptors, warheads or a combination of all four [79].

Thus, estimates of a "defensive footprint" are at best a first order approximation of the capability of a projected system against a specific threat under ideal conditions. As the factors cited above are taken into account and their effects compounded, a clearer appreciation of capability is formed. The actual capability, or that which a system might demonstrate in actual, operational employment, is likely to be far less robust than that suggested by the theoretical construct of footprint. To be sure, some of the degrading effects outlined here can be overcome in the design of the capabilities of the theater missile defense. For example, more powerful radars, faster interceptors, more highly integrated command and control (C2), etc., are possible solutions to some problems. But additional capability does not come without penalty. For example, more powerful radars usually have antennas with greater total area which make them more difficult to transport. Faster interceptors are substantially larger, reducing the number that can be transported by truck, track or airplane. More complicated C2 systems, as any computer network user can attest, are often less robust or require higher levels of maintenance.

This brief review attests to why footprints are not a good way to measure whether a non-ABM system has been given ABM capability. Footprints are the output of many variables; as a result they do not "scale well," that is, are not subject to simple rules of physics ($F=MA$). This is true when assessing the performance of TMD against relatively slow flying threats; it is all the more so when trying to assess the performance of a TMD system against a strategic ballistic missile.

One other pertinent concern remains: how to assess a TMD system if it is supported by components or systems that are not an inherent feature of its design; e.g., sensors based in space. This concern is reasonable given the prospect that a space-based sensor can substantially increase the theoretical capability of a TMD system. The reason for this is that most interceptors can fly farther than their associated radars can see or effectively control the intercept. Space-basing for TMD sensors could enable a TMD interceptor to be launched earlier than

if it depended on its own radar. Consequently, the offensive target is farther away when the intercept occurs. This "early commit" capability can increase the TMD system's "defensive footprint." As the velocity of the offensive missile increases, however, this advantage from the space-basing of sensors declines. The defensive advantage may be restored if the velocity of the TMD interceptor increases. This complex interrelationship among the space-basing of sensors, and the velocities of offensive missiles and defensive interceptors has led to a concern that unless the space-basing of sensors or the velocity of interceptors is limited, a TMD system could attain a significant strategic defense capability.

The ABM Treaty and Space Sensors

In the section of the National Defense Authorization Act for FY 1995 which covers the compliance of ballistic missile defense systems and components with the ABM Treaty (S.2182, Sec.221), the Senate requires a compliance review of "the space-based, midcourse missile tracking system known as Brilliant Eyes," noting that the compliance review should determine "whether, and under what conditions, the development, testing, and deployment of that system in conjunction with a theater ballistic missile defense system, with a limited national missile defense system, and with both such systems, would be in compliance . . ." The Committee Report accompanying the Act contains a specific complaint, that the compliance report on the Brilliant Eyes (BE) system submitted by the Administration for the National Defense Authorization Act for FY 1994 does not resolve this compliance issue. The Committee notes that the Administration has found no compliance issues associated with the use of space-based optical data from DSP satellites, or their proposed follow-on systems, and it recalls the Congressional finding that the ground-launched surveillance and tracking system (GSTS) was compliant. The Committee then concludes that "the BE system appears to be analogous to these systems, relying on telescopic viewing of optical phenomena. Thus, it would appear that, if data from Brilliant Eyes satellites were transmitted, processed, and disseminated in similar fashion to data from existing optical systems, a determination of compliance should be straightforward." The Committee then "insists" that the Administration reach a conclusion regarding the compliance of Brilliant Eyes.

The issue of the compliance of space-based sensors continues to be raised, both within the government and in the arms control community outside the government. While there are limits on ABM radars in the Treaty, there are no limits on other sensors except for the location and orientation of large phased-array radars (LPARs). LPARs must be located on the periphery of the country and oriented outward [80]. There are no limits on the amount and quality of data which may be transmitted from an LPAR to a BMD battle management center, and the Treaty places no limits on battle management [81]. The Treaty does not constrain improvements of these radars or limit the quantity, quality, and distribution of their data except in the following way: if their data were to be provided directly to an ABM interceptor in flight, this would constitute "testing in an ABM mode" and the sensor—and all like it—would become an ABM component subject to the limitations of the Treaty.

The Treaty also does not limit sensors in space unless the sensor data are transmitted directly to an ABM interceptor in flight. If data from space-based sensors were transmitted directly to a TMD interceptor in flight, and if these data gave the interceptor significant ABM capabilities, it would be a violation of Article VI (a)—not to give non-ABM systems or components capabilities to counter strategic ballistic missiles or their elements in flight trajectories. *However, if these data are transmitted to a battle management center and then utilized to give non-ABM systems or components significant ABM capabilities, this would not be a violation of the ABM Treaty because there are no limits on the origin, quantity, or quality of data which can be transmitted directly to a TMD or an ABM battle management center.* Data from space-based sensors, such as DSP, BSTS, FEWS, ALARM, or Brilliant Eyes—now known as Space and Missile Tracking System (SMTS)—can be transmitted directly to BMD battle management centers. There are no limits on the quantity, quality, and utilization of data from ground-, sea-, air-, or space-based sensors as long as these data are transmitted to a BMD battle management center, and there are no limits in the Treaty on battle management.

Verification only by NTM was a key consideration in deriving these Treaty provisions. The United States could not monitor transmissions over land lines from LPARs to the Moscow ABM

battle management center, whereas there were opportunities to monitor transmissions directly to ABM interceptors in flight. Similarly, verification by NTM alone is the basis for the Clinton Administration's adoption of the "demonstrated" standard for determining capabilities. Under the Clinton Administration's demonstrated standard a non-strategic defense system—one not tested against a target whose reentry velocity exceeds 5 km/sec—would not be constrained by the ABM Treaty and hence could utilize sensor data directly or indirectly from space-based sensors.

Consequently, as noted above, some have expressed concern that under the Clinton Administration's proposal, non-strategic systems could attain inherent strategic capabilities, but remain outside of the Treaty's purview. This possibility, it is suggested, would pose an unprecedented and severe challenge to the integrity of the Treaty.

However, the possibility of non-strategic systems having strategic capabilities unaccounted for by the Treaty hardly is new; that possibility has been part and parcel of the Treaty since its signing. U.S. officials long have recognized that some Soviet SAMs, if properly supported, would have inherent strategic ABM capabilities. This problem clearly was acknowledged very early-on with regard to the Soviet SA-5, and more recently with regard to the SA-10 and SA-12 [82]. Yet the U.S. decided not to define these systems as within the Treaty's restrictions because the Treaty's verification regime, based on NTM, did not provide sufficient observable evidence to count these systems, with clear strategic potential, as dedicated strategic ABM systems. As Secretary of State Cyrus Vance noted in 1978 with regard to the SA-5, the United States had not observed the type of SA-5 tests necessary to determine conclusively that the SA-5 was a dedicated strategic ABM system [83].

Consequently, any suggestion that the Clinton Administration's proposed demonstrated standard introduces an unprecedented challenge to the ABM Treaty simply is inaccurate. There always has been the potential, under the Treaty, for non-strategic systems to be given strategic capabilities that could not be accounted for under the Treaty's verification regime [84]. In the past the criteria for assessing NTM data was set so high, or the NTM data so

ambiguous, that the U.S. concerns (e.g., "SAM upgrade") could never be fully resolved. As a result, a *defacto* demonstrated standard for compliance has been operative. Because the *defacto* compliance regime was never formalized, issues of compliance, such as the strategic potential of Soviet SAMs, have remained a constant source of competing interpretation and friction. The Clinton Administration's proposal offers the advantage of formalizing the use of the demonstrated standard. Such an agreement should help put to rest a previous source of friction.

During the Cold War, Moscow and Washington "lived with" the ambiguities of a *defacto* demonstrated standard, and the consequent difficulties it raised with regard to such Treaty issues as the strategic potential of Soviet SAMs. Those commentators who were then most dismissive of the Treaty implications of Soviet "SAM upgrade" essentially questioned not whether some Soviet SAMs had strategic potential, but whether that potential had been demonstrated clearly by "testing in an ABM mode" [85]. More important than whether some Soviet SAMs might have some strategic capabilities, was whether the Soviets generally were showing good faith in complying with the intent of the Treaty.

For example, in the past, John Rhinelander acknowledged the Soviet SA-12's strategic potential, but addressed its Treaty compliance in terms of whether there had been testing "in an ABM mode." Similarly, Rhinelander et. al. challenged expressed U.S. concerns about possible Soviet non-compliance (e.g., SAM upgrade) by arguing that violation of Articles III, V, or VI, "would have to be demonstrated *before* any conclusion that the activities constitute a base for a nationwide ABM system." And, "while the Soviets have the potential for such a breakout [of the ABM Treaty], the Administration has failed to provide any convincing evidence that they are making such a move" [86].

Ironically, now that East-West relations have improved dramatically, and it is much more reasonable to presume good faith, some of these very same commentators are the most vocal in arguing against the Administration's proposal to formalize the demonstrated standard because, they say, it might allow some U.S. TMD systems to have some inherent strategic capability, and this would

constitute a grave threat to the ABM Treaty. This current criticism by those who embraced the demonstrated standard in the past, and thereby were able essentially to dismiss the Soviet SAM upgrade issue, seems both inconsistent and anachronistic.

Why U.S. TMD Systems Are Not Strategically Significant

As previously demonstrated, the technical-operational limitations associated with U.S. TMD systems preclude their having any significant strategic ABM capability. To be sure, there are methods for overcoming these limitations. Most of the methods, as indicated earlier, work to make the systems *less* useful as TMD systems. Nevertheless, projections can be made for technical improvements across many of the subsystems that make up a TMD system—interceptor, sensors, propulsion, guidance, C2—which taken together can improve performance without increasing outrageously the size and weight, of a TMD system. Should this occur, it is feared, "technical creep" will undermine the Treaty's basic goal of limiting strategic ABM capabilities.

To combat this concern, the Russian side in the SCC reportedly has proposed limitations on the performance of the TMD system by capping the permitted velocity of a TMD interceptor. With respect to limits on technical performance levels based on footprint analysis, this approach seeks to reduce to insignificance the area a TMD interceptor can defend against a strategic ballistic missile. But such a limitation, given the range of concerns regarding "technical creep" is at best arbitrary. It clearly ignores other measures whereby the loss in capability imposed by interceptor velocity limitations can be made up. These measures include improving the radar, altering the radar's location, narrowing the handover errors, increasing the inventory of interceptors, altering the location of interceptors, arming the interceptors with nuclear warheads, etc.—all of which are now, and would be legal under the Treaty if only interceptor velocity limitations are imposed. Apart from opening an unending set of technical issues, efforts to limit TMD capability beyond the level publicly announced run into substantial additional difficulties:

- as noted earlier, no Treaty-based definition exists for a "significant" capability that is

restricted by the ABM Treaty, therefore, no floor in technical performance can be determined *a priori*;

- the use of a footprint to determine ABM capability is highly suspect because its size is highly dependent on variables that are not necessarily being controlled;
- and, bringing TMD systems within certain technical parameters could make them incapable of performing the mission for which they are intended—to defend against ballistic missiles with ranges of up to 3,500 km.

The Threat From "Rogue Nations" May Necessitate Highly-Capable Interceptors In Some Cases

According to prominent military expert Lt Gen Glenn Kent, USAF (Ret.), "A simple survey of the globe reveals that a footprint of something like 750 km is required to cover Iran and Iraq—given the assumption that interceptors are deployed in the upper reaches of the Persian Gulf, the lower reaches of the Caspian Sea, and the eastern reaches of the Mediterranean Sea. If we are to operate in the presence of 75 sec of engagement time and aspire to a footprint of 750 km, then by calculation, we need an interceptor rated at 10 km/sec...Our purpose is to underline one critical point—that the demand for fast (or super fast) interceptors is just as strong (if not stronger) for the case of countering rogue nations as for the case of so-called "ABM systems."

Gen. Kent presented his analysis at a conference sponsored by StratCom and the Defense Nuclear Agency, March 1-2, 1994, *Examining the Strategic Costs and Benefits of TMD Deployment*, Offut Air Forces Base. (Quoted with permission.)

The PAC-3/ERINT program has no operational capability against strategic ballistic missiles. THAAD, a subject of concern to some, has no significant operational capability against a modern strategic ballistic missile and re-entry vehicle. Against such a combination, THAAD has little or no capability to defend itself, though some footprints can be discerned against some modern systems. Without an ability to defend itself, it is hardly a system in which reliance can be placed to absorb either a retaliatory strike or a first strike, even at the lower level of offensive forces contemplated by

START II. Moreover, the combination of tactics and countermeasures easily within Russia's capacity would further degrade THAAD's performance. The Navy Lower Tier system suffers from the same basic limitations as PAC-3 against strategic missiles.

The performance of any TMD can be improved by altering radar performance or by providing information from space-based sensors. But the basic design of the Core systems does not free them from their radars, leaving both highly vulnerable to such countermeasures as one or a few nuclear detonations to create conditions that "blind" radars and cause electronic devices to malfunction. And, in the case of the Navy Lower Tier, it provides defense for targets that are relatively close to the location of the ship. As a result, it has no ability to provide an effective strategic defense of the U.S.

The Navy Upper Tier system has an exo-atmospheric kill vehicle capable of intercepting missiles at longer ranges. In theory, such a system can protect large areas; however, it has characteristics similar to those of THAAD. As a result, it too is dependent on its radar, with the associated limitations. Additionally, being based aboard ships that have high operational tempos—i.e., are not in port frequently—and in the event of crisis are likely to be deployed abroad, these platforms do not provide a realistic basis upon which to plan a *strategic* defense of the United States.

The U.S. Airborne Boost Phase Intercept TMD program is inherently incapable of providing an operational defense of the U.S. against a Russian strategic ballistic missile attack. To be effective it would have to be deployed over the launch sites of the strategic ballistic missiles, i.e., over Russian territory and submarines, before the missiles were launched. Such a deployment scheme for the system is extraordinarily doubtful.

THAAD Has No Significant Strategic Operational Capability

A simple example can be used to demonstrate the difference between theater and strategic capabilities. Assume a radar has a detection range of 1000 km against a TBM target and the TBM reentry velocity is 5 km/sec. The defensive system therefore has approximately 200 seconds to track and intercept the TBM before the TBM impacts (if targeted to the defense site).

Assuming that the interceptor is launched 15 seconds after initial detection and has a capability to achieve instantaneous 3 km/sec, then the interceptor will fly approximately 115 seconds and intercept the incoming missile 345 km from the defense site. (This is optimistic because it assumes that the interceptor is immediately traveling 3 km/sec, when it really may be a slow starter.)

Now assume that the same radar has a detection range of 400 km against a strategic target and the ICBM reentry velocity is 7 km/sec. The defense system would have 57 seconds to act before the ICBM impacts (if targeted to the defense site). In that 57 seconds, the object must be tracked, data must be provided to the TMD GBR which then provides surveillance and fire control for committing the interceptor. Assuming that the interceptor is launched at 15 seconds after detection and has a capability to achieve 3 km/sec instantaneously, then the interceptor will fly approximately 30 seconds and intercept the incoming missile 90 km from the defense site. The timelines for strategic targets are much shorter in reality.

However, even such analysis does not take into account the following:

- the radar cross sections of modern strategic warheads are much lower than that of TBM targets, thereby significantly decreasing, or even denying, early radar detection and tracking;
- in the short amount of time available, an interceptor may need to discriminate the warhead from debris and/or penetration aids;
- the interceptor may still be burning during the 30 seconds it has to fly to the intercept point and may not be able even to uncup its seeker;
- unless the strategic target is below 80 km, it may not be hot enough to see even if the seeker was uncapped (at the wavelength of the THAAD seeker design);

In summary, while concerns have been raised about the ability of U.S. TMD elements to provide strategic capabilities, such an evolution cannot be easily accomplished without losing the ability to perform TMD missions. Further, the operational and technical characteristics of the systems as they have been designed, do not pose any significant capability against strategic ballistic targets. The technical and operational characteristics of the systems are well-known to both the U.S. and the Russians. Therefore, TMD deployment involving U.S. programs and the Clinton Administration's announced Demarcation agenda—of 5 km/sec and demonstrated capabilities—would not violate the spirit or terms of the ABM Treaty, would not require an ABM Treaty

modification nor would it require extensive discussions of verification or implementation.

It would appear that the positions being taken by some critics of the Administration could result in forcing the Administration and the Congress to choose between effective TMD and the ABM Treaty. In our view, forcing such a choice is not necessary.

Limitations on Radar Performance

The issue of radar performance is critical to understand. It is often assumed that space cueing greatly increases a ground based radar's detection range. But unless the radar is precisely matched to the cue the errors generated by the cueing system relative to the radar can cause the cue volume to be too large to be useful. In the case of an existing radar, e.g., AN/SPY-1, it does non-coherent integration so the cue doesn't increase the detection range much. Although all radars could be designed (or redesigned) to perform coherent integration, such designs could render them more vulnerable to countermeasures. Nor does increasing the power of the radar necessarily result in ABM capability. For example, the AN/SPY-1 radar has a power aperture (PA) that is slightly *larger* than the TMD GBR. The TMD GBR's detection range, however, is two or three times *greater* than the SPY-1's. They operate at different frequencies, benefit from external cues differently and have different system losses. These constraints on performance are compounded by the probability that strategic RVs will have substantially smaller radar cross sections. All of these issues substantially reduce detection range and hence system capability.

players, not a bilateral affair. This may be a key issue because the history of multilateral negotiations—involving key military capabilities and parties experiencing severe political differences—does not bode well for future multilateral agreements concerning the Treaty.

If the multilateralization process proceeds, future changes on the subject of Demarcation or other possible Treaty issues that may arise, may become non-negotiable [88]. Consequently, suggestions that questions of Demarcation can be deferred or settled "for now," and reconsidered in the future as might be necessary, run the risk of incorrectly assuming that further adaptation of the Treaty to changing conditions will be readily negotiable. In the context of the fast pace of proliferation and the increasing lethality and range of the theater missiles that are proliferating, "settling" now for TMD capabilities that are likely to be insufficient in the foreseeable future, could lock the United States into restrictions soon to be onerous, but not easily undone.

THE SIGNIFICANCE OF MULTILATERALIZATION FOR THE DEMARCATON DEBATE

In December 1993, the Clinton Administration announced its acceptance of "multilateralization" of the ABM Treaty, and directed that negotiations begin on "procedures to implement a multilateral succession." In this regard, the United States has announced that "it is willing to accept as Treaty Parties any of the New Independent States (NIS) [i.e., of the former Soviet Union] that want to be Party to the Treaty" [87].

This development could lead to a significant expansion of the Parties to the Treaty, including Parties with critical political, economic and military disputes (e.g., Russia and Ukraine). The multilateralization of the ABM Treaty in this manner has dramatic potential implications for the Demarcation effort. Future issues involving Treaty definitions, interpretations, or even revisions would be the subject of negotiation among multiple

NOTES

1. Les Aspin, Annual Report to the President and the Congress, January 1994 (Washington, D.C.: USGPO) p. 51. This agenda is also reflective of Congress's Missile Defense Act of 1991, as amended in Fiscal Years 1993 and 1994 National Defense Authorization legislation.

2. *Ibid.*

3. For example, in September 1993 U.S. Secretary of Defense Les Aspin and Japanese Defense Minister Keisuke Nakanishi agreed to establish a joint committee to investigate how the U.S. and Japan can cooperate in the development of BMD. See, Barbara Opall and Naoaki Usui, "Japan, U.S. Pursue Ballistic Missile Defense," *Defense News*, October 4-10, 1993, p. 14. With regard to the French BMD initiative, the 1994 French White Paper identifies BMD as one of the necessary means of responding to proliferation. See, *Livre Blanc sur la Defense 1994, op. cit.*, p. 62. Finally, the British Secretary of State for Defence, Malcom Rifkind, recently acknowledged that, "ballistic missile defence...is attracting growing attention in the face of the proliferation of ballistic missiles around the world." Mr. Rifkind went on to announce that the British would conduct, "a two-year national programme" of studies to examine the cost and effectiveness of BMD as a counterproliferation measure. See, Malcolm Rifkind, "Defence Capabilities," speech delivered at King's College, London, February 15, 1994 (London Ministry of Defence), pp. 11-12 (mimeo); see also, Rachel Johnson, "Britain to study ballistic missile defence system," *Financial Times*, February 16, 1994, p. 10. Sir Nicholas Bonsor, a member of Parliament who chairs the Commons Select Committee on Defence recently observed quite rightly that, "The NATO allies must renew the program to produce an effective antiballistic missile defense system." See, Sir Nicholas Bonsor, "World Lurches Toward War," *Defense News*, February 21-27, 1994, p. 36.

4. In 1972, the U.S. Government made a conscious decision not to include such limits for three reasons: the questionable ability to verify the proposed limits by NTM alone; the desire to maintain flexibility in developing future U.S. defense programs; and the flexibility to challenge Soviet activities associated with upgrading their extensive SAM systems.

5. This is an important point because the Treaty was negotiated to fit a verification regime based on national technical means. As Ambassador Gerard Smith stated before the Senate Armed Services Committee in 1972, "We tailored the limitations to fit the capabilities of national technical means of verification." See, his prepared testimony before the U.S. Senate, Armed Services Committee, *Military Implications of the Treaty on the Limitations of Anti-Ballistic Missile Systems and the Interim Agreement on Limitation of Strategic Offensive Arms*, 92nd Congress, 2nd Session (Washington, D.C.: USGPO, 1972) p. 287.

6. These arguments are drawn from the following sources: statements published in "A New Threat to the ABM Treaty: The Administration's TMD Proposal," the proceedings of a news conference on December 8, 1993 as published in the January/February 1994 issue of *Arms Control Today*; Spurgeon Keeny, "Statement before the Senate Foreign Relations Committee," May 3, 1994; Arms Control Association Editorial Advisory, "What Price Counterproliferation?"; and Spurgeon Keeny, "Inventing an Enemy," *New York Times*, June 18, 1994, p. 21; and Lisbeth Gronlund, George Lewis, Theodore Postol and David Wright, "Highly Capable Theater Missile Defenses and the ABM Treaty," *Arms Control Today*, Vol. 24, No. 3 April 1994, pp. 3-8.

7. Spurgeon Keeny, "Inventing an Enemy," *New York Times*, June 18, 1994, p. 21.

8. Portions of this section and the next section draw, with permission, from Keith B. Payne, "Proliferation, Deterrence, Stability and Missile Defense," *Comparative Strategy* (January-March 1994), pp. 117-131; and an article on counterproliferation by Keith B. Payne, in the forthcoming Spring 1995 issue of *Orbis*.

9. Les Aspin, "Annual Report to the President and the Congress," January 1994, (Washington, D.C.: USGPO) p. xiv. The direct WMD/missile threat to the U.S. from select proliferant states could develop "after the turn of the century," according to public statements by the CIA Director Woolsey. He added that there exist certain "shortcuts" to ICBM acquisition that, "would, of course, speed up ICBM acquisition by such nations." See, R. James Woolsey, Testimony before the United States Senate, Committee On Governmental Affairs, *Proliferation Threats Of The 1990s*, Hearings, 103rd Congress, 1st Session, February 24, 1993 (Washington, D.C.: USGPO, 1993), p. 28.

10. NATO's 1991 Rome Summit, for example, included an agreed statement by the heads of state that the risk posed by, "the proliferation of ballistic missiles and weapons of mass destruction should be given special consideration." Quoted from NATO documentation appearing in, "Rome Declaration On Peace And Cooperation," *NATO Review*, No. 6 (December 1991), p. 31. And, the January 1994 NATO Summit in Brussels included direction by the heads of states to "intensify and expand NATO's political and defence efforts against proliferation," and for the development of an overall NATO policy framework to meet the proliferation threat. See, NATO Press Service, *Declaration Of The Heads Of State And Government Participating In The Meeting Of The North Atlantic Council Held At NATO Headquarters, Brussels, On 10-11 January 1994*, January 11, 1994, p. 5. See also, Theresa Hitchens, "NATO Leaders Enjoy Rare Accord on Arms," *Defense News*, January 10-16, 1994, p. 1. The recent French Defense White Paper states that, "Thirteen countries located principally in the Middle East and Asia possess or are developing missiles of a range greater than 300 km and several [missiles] have ranges equal or greater than 1000 km." It concludes that, "The proliferation of nuclear, biological and chemical weapons of mass destruction, associated or not with ballistic vectors, will pose new problems for our defense apparatus, as much for the

protection of the national territory as for the protection of French forces deployed externally." French Ministry of Defense, *Livre Blanc sur la Defense*, 1994 (Paris: Ministry of Defense, 1994), pp. 15, 62.

11. Dr. Lawrence K. Gershwin, "Threats to U.S. Interests From Weapons of Mass Destruction Over the Next Ten to Twenty Years," *Comparative Strategy*, Vol. 12, January 1993, p. 9. The Russians have also recognized the seriousness of this threat: see, Russian Federation Foreign Intelligence Service, *A New Challenge After the Cold War: Proliferation of Weapons of Mass Destruction*, 1993, (Moscow); in JPRS Report: Proliferation Issues (JPRS-TND-93-007), March 5, 1993, p. 11.

12. R. James Woolsey, Testimony before the Senate Committee on Governmental Affairs on Proliferation Threats of the 1990's, February 24, 1993, p. 2 (mimeo).

13. *Ibid.*

14. *Statement on the Defence Estimates 1992*, Cm 1981, London, HMSO (July 1992); quoted in Dr. Graham S. Pearson, "Biological Weapons: A Priority Concern," in Kathleen Bailey, ed. *Director's Series on Proliferation*, No. 3, (UCRL-LR-114070-3), January 5, 1994, p. 49.

15. U.S. Congress, Office of Technology Assessment, *Proliferation of Weapons of Mass Destruction: Assessing the Risks*, OTA-ISC-559, August 1993, (Washington D.C.: USGPO), p. 64.

16. Bill Gertz, "Scud's Bigger Brothers," *Air Force Magazine*, Vol. 77, No. 6, June 1994, p. 52-57.

17. As observed by R. James Woolsey, in, "US Officials Welcome Delay In N. Korean Missile Sale," *Christian Science Monitor*, December 27, 1993, p.4.

18. *Ibid.* According to Robert Walpole, Deputy Director of the CIA Nonproliferation Center, "[North Korea] is willing to sell to any country with the cash to pay. The *Nodong* will give Iran double the range of any missile it currently has in its inventory... North Korea has apparently discussed missile deals as well with Libya. Robert Walpole, Statement at the American Bar Association Conference on Nonproliferation of Weapons of Mass Destruction, Washington, D.C., June 10, 1994.

19. *Ibid.*

20. R. James Woolsey, "Intelligence and Democracy: The CIA and American Foreign Policy," Address to the Conference on "The Origins and Development of the CIA in the Administration of Harry S. Truman," Washington, D.C., March 17, 1994, p. 9 (mimeo).

21. According to the Monterey Institute of International Studies Program for Nonproliferation Studies "if the solid fuel used is extremely efficient and the payload is reduced, the Taepo Dong-2's range could be as much as 9600 km." Monterey Institute of International Studies, Program for Nonproliferation Studies, "Missile and Space Launch Capabilities of Selected Countries," *The Nonproliferation Review*, Vol. 1, No. 3, Spring-Summer 1994, p. 86. See also,

Barbara Starr, "N Korea cast a longer shadow with TD-2," *Jane's Defence Weekly*, March 12, 1994, p. 1; Martin Sieff "Japan, S. Korea join missile race with N. Korea," *The Washington Times*, March 24, 1994, p. A-12; and, "North Korea grasps at the stage beyond Nodong-1," *Jane's Defence Weekly*, March 19, 1994, p. 18.

22. As CIA Director Woolsey has recently stated, "We can confirm that the North Koreans are developing two additional missiles with ranges greater than the 1,000 kilometer missile that it flew last year. These new missiles have yet to be flown, and we will monitor their development, including any attempts to export them in the future to countries such as Iran. Unlike the missiles the North Koreans have already tested, these two—if they are developed and flight tested—could put at risk all of North East Asia, Southeast Asia and the Pacific area, and if exported to the Middle East, could threaten Europe as well." As stated in, Address by Director of Central Intelligence, R. James Woolsey, *Intelligence and Democracy: The CIA And American Foreign Policy*, Before the Conference on "The Origins and Development of the CIA in the Administration of Harry S. Truman," March 17, 1994, p. 9, (mimeo).

23. R. James Woolsey, Presentation at the National Defense University series on "BMD, Counter Proliferation, Arms Control and Deterrence," Washington, D.C., 22 June 1994. Similarly, Assistant Secretary of State for Political Military Affairs, Robert Gallucci, has noted that, "The ballistic missile program, when mated to a nuclear weapons program, gives the North Koreans the prospect of being able to project that nuclear weapons capability a far distance... Their very active ballistic missile development program—in the *Nodong* and in the follow-on missiles—gives them ranges when developed—when they become operable—in the thousands and several thousands of kilometers." Robert Gallucci, at the American Bar Association Conference on Nonproliferation of Weapons of Mass Destruction, Washington, D.C., June 10, 1994.

24. "Miyaza Calls DPRK Nuclear Development 'Direct Threat'," *Yomiuri Shimbun*, June 7, 1993, p. 2.

25. Quoted in, "Japan Spells Out Nuclear Stance," *Los Angeles Times*, July 29, 1993, p. A-18. See also, Martin Sieff, "Japan Mulls Atomic Weapons to Deter Nuclear Neighbors," *The Washington Times*, November 10, 1993, p. A-13.

Japanese concern about North Korean intentions may be appropriate: in an interview with the YONHAP News Agency, and in a speech before the U.N. Economic and Social Commission for Asia and the Pacific, Cha Pong-chu, the North Korean Ambassador in New Delhi, reportedly stated that, "Our nuclear arms, if developed, would be primarily designed to contain Japan." Shim Sung-won, "S. Korea Forms Crisis Team in N. Korean Nuclear Row," *Reuter*, 2:42 E.T., April 7, 1994.

In a separate but similar development, former North Korean Army 1st Lt., Yim Yong-son, who defected to the South in September 1993, stated that North Korea had begun to build missile launch sites near the border with China, in the belief that the U.S. would not strike at sites near the Chinese border. See, YONHAP, 0152 GMT, April

8, 1994; in FBIS Daily Report: East Asia (FBIS-EAS-94-068), April 8, 1994, p. 32.

26. Missile information is drawn from a variety of open source materials. Sources include: IISS, *The Military Balance 1993-1994*, (London: Brassey's 1993); Joseph S. Bermudez Jr., Statement before House Committee on Foreign Affairs Subcommittee on International Security, International Organizations and Human Rights, September 14, 1993, (mimeo); Monterey Institute of International Studies, International Missile Proliferation Project, "Missile Capabilities of Selected Countries," *Missile Monitor*, No. 3, Spring 1993, pp. 1-3; Monterey Institute of International Studies, Program for Nonproliferation Studies, "Missile and Space Launch Capabilities of Selected Countries," *The Nonproliferation Review*, Vol. 1, No. 3, Spring-Summer 1994, p. 86; Proliferation Study Team, *The Emerging Ballistic Missile Threat to the United States*, February 1993, (Fairfax, VA: NIPP); Richard Fieldhouse, *Chinese Nuclear Weapons: A Current and Historical Overview*, Nuclear Weapons Databook Working Papers NWD 91-1, March 1991, (Washington D.C.: Natural Resources Defense Council); Russian Federation Foreign Intelligence Service, *A New Challenge After the Cold War: Proliferation of Weapons of Mass Destruction*, 1993, (Moscow); in JPRS Report: Proliferation Issues (JPRS-TND-93-007), March 5, 1993; System Planning Corporation, *Ballistic Missile Proliferation: An Emerging Threat 1992*, October 1992, (Arlington, VA: SPC); Barbara Starr, "N Korea casts a longer shadow with TD-2," *Jane's Defense Weekly*, March 12, 1994; Robert Norris, et al, *Nuclear Weapons Databook Vol. V: British, French, and Chinese Nuclear Weapons*, (Boulder, CO: Westview Press), 1994; Missile Proliferation, Missile Capabilities, *The Arms Control Reporter* 1994, Section 706, p. 706.E.1; and Bill Gertz, "Scud's Bigger Brothers," *Air Force Magazine*, Vol. 77, No. 6, June 1994, p. 52-57.

27. R. James Woolsey, "Intelligence and Democracy: The CIA and American Foreign Policy," Address to the Conference on "The Origins and Development of the CIA in the Administration of Harry S. Truman," Washington, D.C., March 17, 1994, p. 9 (mimeo).

28. U.S. Defense Secretary recently stated that, "Within weeks it will be necessary for North Korea to remove fuel which is now in its 25-megawatt reactor. . . This fuel would provide sufficient plutonium to make four to five nuclear bombs." Quoted in, "Perry Says North Korea Soon To Have Plutonium Stockpile," *Reuter*, transmitted: 94-04-21, 10: 50 EDT. See also, R. Jeffrey Smith, "U.S.-South Korean Exercise Put Off as Gesture to North," *Washington Post*, April 21, 1994, p. A-18.

29. For a review of both ballistic and cruise missile proliferation see, W. Seth Carus, "Ballistic Missiles in the Third World: Threat and Response," *The Washington Papers*, 146 (New York: Praeger Publishers, 1990); and W. Seth Carus, "Cruise Missile Proliferation In The 1990s," *The Washington Papers*, 159 (New York: Praeger Publishers, 1992).

30. As Gen. Philippe Morillon, a French commander of the UN forces in Bosnia observed, "Desert Storm left one awful legacy. It imposed the idea that you must be able to fight the wars of the future without suffering losses. the idea of zero-kill as an outcome has been imposed on American generals. But there is no such thing as a clean or

risk-free war. You condemn yourself to inactivity if you set that standard." Quoted in, Jim Hoagland, "Even America Gets the Blues," *Washington Post*, December 14, 1993, p. A25. In recognition of the requirement to minimize casualties, the Joint Chiefs of Staff have specified that, "in all cases, U.S. military forces must be able to undertake operations rapidly, with a high probability of success, and with minimal risk of U.S. casualties." 1993 *Joint Military Net Assessment*, unclassified version (Washington, D.C.: Department of Defense, 1993), p. 3. The authors would like to thank Kurt Guthe for bringing to their attention this important point and the statements cited above.

31. Dwight D. Eisenhower, *Crusade in Europe* (New York: Doubleday, 1949), p. 260.

32. For the best available discussion of the threats posed by the proliferation of nuclear, chemical, and biological weapons, see, Kathleen Bailey, *Doomsday Weapons in the Hands of Many* (University of Illinois Press: Chicago, 1991), especially chapters 2, 4, and 7.

33. Remarks by Saddam Hussein are instructive in this regard. For example, months before the invasion of Kuwait, Saddam Hussein expressed a deterrent theme with regard to Israel by stating that if Israel ever, "tries to do anything against Iraq," Iraqi chemical weapons would "make the fire eat up half of Israel." Quoted in, Alan Cowell, "Iraq Chief, Boasting of Poison Gas, Warns of Disaster if Israelis Strike," *The New York Times*, April 3, 1990, p. A1. Libya's Col. Qadhafi, Iranian leader Hashem-Rafsanjani, and Gen. Hamid Gul of Pakistan also have sounded deterrent or coercive themes with regard to missiles and WMD. See, Speech by Qadhafi at a meeting of students of the Higher Institute for Applied Social Studies at the Great al-Fatih University, April 18, 1990, Tripoli Television Service, April 19, 1990; in FBIS Daily Report: Near East and South Asia (FBIS-NES-90-078), April 23, 1990, p. 8; and, "Gul Interviewed on Nuclear Program, National Unity," *Karachi Takbeer*, June 9, 1994, pp. 16-18; in JPRS Report: Near East and South Asia (JPRS-NEA-94-037), July 11, 1994, pp. 57-58.

34. This clearly was one of President Clinton's objectives in his July 1993 visit to the intra-Korean border, where he stated regarding the prospect of North Korea developing nuclear weapons, "We can't let it happen....We would quickly and overwhelmingly retaliate if they were to ever use, to develop and use, nuclear weapons. It would mean the end of their country as they know it." Quoted in, Frank Murray, "Clinton warns North Korea not to test him," *Washington Times*, July 10, 1993, p. A-1.

35. Keeny, "Inventing an Enemy," op. cit.

36. See the discussion in, Keith B. Payne, "Proliferation, Deterrence, Stability and Missile Defense," *Comparative Strategy* (January-March 1994) pp. 117-129.

37. M.S. Vinogradov, *Report by the Coordinator of the 1st Section at the Plenary Session of the Conference on the Problems of the Global System of Protection*, November 22, 1993, Moscow, p. 3 (mimeo).

38. Peter Karsten, Peter D. Howell, and Artis Frances Allen, *Military Threats: A Systematic Historical Analysis Of The Determinants Of Success* (Westview Conn.: Greenwood Press, 1981), p. xii.

39. See, for example, *Ibid.*; Robert Jervis, Richard Ned Lebow, Janice Stein, *Psychology and Deterrence* (Baltimore, MD: Johns Hopkins University Press, 1985; and Richard Ned Lebow, *Between Peace and War* (Baltimore, MD: Johns Hopkins University Press, 1981); Raoul Naroll, Vern L. Bullogh, Frada Naroll, *Military Deterrence In History: A Pilot Cross-Historical Survey* (Albany, N.Y.: State University of New York Press, 1974), pp. 342-343.

40. History provides numerous examples of leaders behaving in ways that appeared reasonable to them at the time, given the particular context in which they operated, but seem mistaken or misinformed in hindsight. The Japanese leadership in 1941, for example, appears to have recognized and accepted the grave risk involved in the attack on Pearl Harbor, but believed that the slim prospect for ultimate success in war was preferable to inaction and the inevitable loss of Japanese power to the U.S. in the Pacific. Indeed, the classic historical analysis by the Office of the Chief of Military History, Department of the U.S. Army, concludes that Japanese leaders saw no alternative to war because they believed that Japan was "doomed" if it did not meet the U.S. challenge forcefully: Japan had no alternative but to go to war while she still had the power to do so. She might lose, but defeat was better than humiliation and submission. 'Japan entered the war,' wrote a prince of the Imperial family, 'with a tragic determination and in desperate self-abandonment.' If she lost, 'there will be nothing to regret because she is doomed to collapse even without war.'

Quoted from, Louis Morton, "Japan's Decision for War," *Command Decisions* (New York: Harcourt, Brace and Company, 1959), p. 87.

41. April Glaspie, former U.S. Ambassador to Iraq, has observed that prior to Iraq's August 2nd invasion of Kuwait the U.S. warned Saddam Hussein against aggression. Obviously that attempt to deter Saddam from aggression failed. See, Don Oberdorfer, "Glaspie Says Saddam Is Guilty of Deception," *The Washington Post*, March 21, 1991, p. A23.

Perhaps an appreciation of Saddam Hussein's perspective helps to explain behavior that otherwise appears inexplicable. Such an appreciation can be gleaned from the following statement by Saddam; it suggests that he would not bow to deterrent pressure, regardless of the possible costs:

"you use pressure, we will deploy pressure and force. We know that you can harm us, although we do not threaten you. But we too can harm you...You can come to Iraq with aircraft and missiles, but do not push us to the point where we cease to care. And when we feel that you want to injure our pride and take away the Iraqis' chance of a high standard of living, then we will cease to care, and death will be the choice for us. Then we would not care if you fired 100 missiles for each missile we fired. Because without pride life would have no value."

See Don Oberdorfer, "Missed Signals In the Middle East," *The Washington Post Magazine*, March 17, 1991, p. 39.

42. Quoted in, Don Oberdorfer, "Glaspie Says Saddam Is Guilty of Deception," *op. cit.*, p. A24.

43. Quoted in, Bill Gertz, "N. Korea nears big jump in effort for nuclear bomb," *The Washington Times*, April, 8, 1994, p. A-3.

44. A recent remark attributed to the late Kim Il sung by Cambodia's King Sihanouk may be instructive in this regard: "They [the American leadership] want us to take off our shirt, our coat and now our trousers. And after that we will be nude, absolutely naked. What they want us to be is a man without defense secrets, just a naked man. We cannot accept that. We would rather accept war." Quoted in, William Branigin, "With Koreas Agreeing to Summit, Doesn't Necessarily Mean They'll Hold One," *Washington Post*, July 1, 1994, p. A30.

45. "Proposed Remarks by William H. Webster, Director of Central Intelligence, Before the Town Hall of California," Los Angeles, March 30, 1989 (mimeo), pp. 14-15; and "Brief: Ballistic Missile Proliferation in the Developing World," in Arms Control and Disarmament Agency (ACDA), *World Military Expenditures and Arms Transfers—1988* (Washington, D.C.: USGPO, June 1989), p. 20.

46. As reported in, Kathleen C. Bailey, "Can Missile Proliferation Be Reversed?" *Orbis* (Winter 1991), p. 11. More recently, China has implicitly tied participation in the MTCR to U.S. trade policies with Taiwan. See, Richard Barnard and Barbara Opall, "China Ties MTCR to U.S.-Taiwan F-16 sale," *Defense News*, March 7-13, 1994, pp. 1, 21.

47. See, Office of Technology Assessment, United States Congress, *Export Controls and Nonproliferation Policy*, OTA-ISS-596, (Washington, D.C.: USGPO, May 1994), p. 47; and, Barnard and Opall, *op. cit.*, pp. 1, 21.

48. Webster, Director of Central Intelligence, in U.S. Senate, Committee On Governmental Affairs, Hearings, *Nuclear and Missile Proliferation*, (Washington D.C.: USGPO, 1990), pp. 10, and 12-13.

49. As former CIA Director Webster stated in this regard, "Unfortunately, most technologies applicable to a space program can be used in ballistic missile development. Several countries have space and missile programs which overlap. Space programs have been used as a conduit for materials and equipment destined for a ballistic missile development effort. Moreover, as both the United States and Soviet Union have demonstrated, space launch vehicles themselves can be converted into ballistic missiles." Testimony on *Nuclear and Missile Proliferation*, *Ibid.*, p. 12.

50. Dr. Kathleen C. Bailey, *Doomsday Weapons in the Hands Of Many*, (Urbana: University of Illinois Press; 1991), p. 115.

51. Giovanni A. Snidle, "United States Efforts in Curbing Chemical Weapons Proliferation," in Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers—1989* (Washington, D.C.: USGPO, October 1990), pp. 22-23; and Defense Intelligence Agency, "Weapon Proliferation in the Third World," June 1990, report for Senator John Warner, reprinted in *Congressional Record—Senate*, August 4, 1990, p. 12347.

52. See, Bailey, *Doomsday Weapons in the Hands of Many*, op. cit., pp. 60-61.

53. See, Bailey, "Can Missile Proliferation Be Reversed?" op. cit., pp. 5, 8.

54. Ashton Carter, "Letters to the Editor—Export Controls Alone Can't Present Proliferation," *The Washington Post*, February 14, 1994, p. A-14.

55. See, John Wilson Lewis and Hua Di, "China's Ballistic Missile Programs: Technologies, Strategies, Goals," *International Security*, Vol. 17, No. 2 (Fall 1992), pp. 34-35.

56. Barbara Starr, "N Korea casts a longer shadow with TD-2," *Jane's Defense Weekly*, March 12, 1994. and R. Jeffrey Smith, "CIA Confirms North Korea's New Missiles," *The Washington Post*, March 18, 1994, p. A24.

57. Statement by Joseph S. Bermudez, Jr. Before the House Committee on Foreign Affairs Subcommittee on International Security and International Organizations and Human Rights, September 14, 1993, (mimeo).

58. R. James Woolsey, "Nuclear Security and Organized Crime," Testimony before the House Foreign Affairs Committee, International Organizations and Human Rights Subcommittee Hearing, June 27, 1994 (mimeo).

59. Warren Strobel, "N. Korea shops for nuke technology in Russia," *Washington Times*, July 5, 1994, pp. A.1, A8.

60. *Ibid.*

61. As reported in, Jamie Dettmer, "Germany hunts 5 Iraqis linked to plutonium seizure," *Washington Times*, July 29, 1994, p. 1. There have reportedly been three such seizures by German authorities in the past four months; German authorities have indicated that the plutonium comes from Russia. See, Kevin Liffey, "Russia Fails To Convince Bonn on Illicit Plutonium," *Washington Times*, August 16, 1994, p. A11.

62. R. James Woolsey, "Nuclear Security and Organized Crime," op. cit.

63. Even those who have been very critical of BMD in the past, now acknowledge the requirement for BMD in light of proliferation. See, for example, the recent article by a former critic, Charles Krauthammer, "Heading Off the Nuclear Outlaws," *The Washington Post*, April 1, 1994, p. A-21.

64. Quoted in, Ju-Yeon Kim, "N. Korea tantrum escalates anxiety," *The Washington Times*, March 20, 1994, p. 1; and, R. Jeffrey Smith, "Clinton Orders Patriot Missiles To South Korea," *The Washington Post*, March 22, 1994, p. 1.

65. James Blight and David Welch, *On The Brink: Americans and Soviets Reexamine the Cuban Missile Crisis*, (New York: Hill And Wang, 1989), p. 57, 80, 88, 193, 349. From the same source, Dean Rusk states, "Well, the trouble with an air strike, if the missile sites were operational, was that there was no guarantee that you'd get them all. There's a possibility you'll have some strikes against the United States. You see, the Air Force was asked about this and they could not guarantee that they would get all the sites. They might get 85 to 90 percent of them, but they wouldn't get them all. And this was an important point to President Kennedy," p. 176. See also, Raymond Garthoff, *Reflections on the Cuban Missile Crisis* (Washington, D.C.: The Brookings Institution, 1989), pp. 49-50.

66. See for example the interview of Yeltsin by an ITAR-TASS correspondent, in TASS, 0538 GMT, February 1, 1992, in FBIS, Daily Report: Central Eurasia, February 3, 1992, pp. 21-22. See also the views of Vladimir Lukin, formerly the chairman of the International Affairs Committee of Russia's Supreme Soviet and more recently, Russia's Ambassador to the United States, in, Radio Rossi, "Information-Analytical" Program, 0800 GMT, October 1, 1991; in FBIS Daily Report: Soviet Union, October 1, 1991, p. 50.

67. Sergei Blagovolin, "Stability and Deterrence Under Contemporary Conditions and the Role of Ballistic Missile Defense," presentation delivered at the *US-Russian Roundtable on Deterrence and Missile Defense*, September 29, 1993.

68. Interview with Dr. Sergei Blagovolin and Alexander Savelyev, July 15, 1994,

69. Interview with Amb. Kathleen Bailey, former Assistant Director of ACDA for Non-Proliferation.

70. As announced by Victor Slipchenko, of the Russian Foreign Ministry, at the Wilton Park Conference, 408, "Nuclear Weapons: The Threat to Global Security and Prospects for Extension of the NPT," February 14-18, 1994.

71. This point concerning the value of counterproliferation measures, including TMD, for some nonproliferation efforts was recently endorsed by Leonard S. Spector, one of the country's leading experts on proliferation and a frequent proponent of traditional diplomatic solutions. As discussed during his presentation at, *U.S. National Security Policy: The Arms Control and Nonproliferation Policy Foundation and Implementation Process*, a seminar sponsored by the American Association for the Advancement of Science, July 19, 1994, Washington, D.C.

72. "U.S. Takes Nuclear Gamble," *Defense News*, April, 4-10, 1994.

73. The SS-N-6 counted under SALT II as a strategic missile; the SS-N-5 was not counted. Thus, the SS-N-6 was

the dividing line in the 1970s between strategic and theater ballistic missiles.)

74. That the "Foster Box" is used commonly in the Pentagon is noted in, Thomas Longstreth, John Pike, and John Rhinelander, *The Impact of U.S. and Soviet Ballistic Missile Defense Programs on the ABM Treaty*, A Report for the National Campaign to Save the ABM Treaty (Washington, D.C.: National Campaign to Save the ABM Treaty, March 1985), p. 56; and, Thomas Johnson, "Ground-Based ABM Systems," *Defending Deterrence*, Antonia Chayes and Paul Doty, eds., (New York: Pergamon-Brassey's, 1989), pp. 127, 131.

75. Sec. 234 (a) (7) of P. L. 103-160.

76. As reported in Congressional Budget Office, *The Future of Theater Missile Defense*, June 1994, p. 50.

77. Lisbeth Gronlund, George Lewis, Theodore Postol and David Wright, "Highly Capable Theater Missile Defenses and the ABM Treaty," *Arms Control Today*, Vol. 24, No. 3 April 1994, pp. 3-8.

78. George Lewis, "The Compatibility of Highly Capable Theater Missile Defenses with the ABM Treaty," presented at a Hearing of the Senate Committee on Foreign Relations on May 3, 1994, p. 16 (mimeo).

79. Some of the current critics of the U.S. TMD program and Demarcation position recognized the importance of these various factors earlier, when challenging expressed U.S. concerns about the strategic potential of Soviet systems. As a report by Stanford University's Center for International Security and Arms Control noted with regard to the possibility that Soviet SAM or TMD interceptors could acquire strategic capability, "Although such an upgrade could enable the interceptor to hit strategic ballistic missiles under limited engagement conditions and geometries, one must recognize that the offense has a fair amount of control over the attack signature and geometry." And, "If the Soviet Union could assemble even a rudimentary territorial defense from existing components, this should be a matter of some concern to the United States. But a system whose successful operation is contingent on so many conditions could hardly represent a reliable enough defense against nuclear attack to threaten the U.S. deterrent." See, *Compliance and the Future of Arms Control*, of a project sponsored by the Center for International Security and Arms Control, Stanford University and Global Outlook (Cambridge, MA: Ballinger Publishing Co., 1988), pp. 37, 38.

80. Because the FSU Krasnoyarsk radar was not located on the periphery, it was a violation of the ABM Treaty.

81. U.S. data from BMEWS can be transmitted to NORAD, just as data from FSU LPARs can be transmitted to Moscow. The 1993 "President's Report to Congress on Soviet Noncompliance with Arms Control Agreements" states that "the USG now judges that the support of ABM systems by early warning radars providing precise handover data will not constitute use of the early warning radars as ABM radars in violation of the ABM Treaty."

82. As Secretary of Defense Laird observed in 1970, "In addition to the Moscow ABM system, the Soviets have deployed a very extensive, sophisticated air defense system across the approaches to Western Russia. We cannot rule out the possibility that the Soviets have given or will give this system, called the SA-5 or TALLINN system, an ABM role. We believe such a role is technically feasible for this system." In U.S. Senate, Foreign Relations Committee, Hearings, *ABM, MIRV, SALT, and the Nuclear Arms Race* (Washington, D.C.: GPO, 1970), p. 289. And with regard to the SA-10 and SA-12, a 1985 report by the Departments of Defense and State concluded that, "They could, if properly supported, add a significant point-target defense coverage to a nationwide Soviet ABM deployment." See *Soviet Strategic Defense Programs* (Washington, D.C.: Department of Defense and Department of State, 1985), p. 21. And as recorded by Senator Malcolm Wallop in the *Congressional Record*, "The CIA says this missile [the SA-12] has significant capabilities to intercept ballistic missile RVs, including strategic RVs." See *Congressional Record-Senate*, August 5, 1986, p. S10377. See also, Sayre Stevens, "The Soviet BMD Program" in, *Ballistic Missile Defense*, Ashton Carter, David Schwartz, eds. (Washington, D.C.: The Brookings Institution, 1984), pp. 206-207. As Sayre Stevens writes, "A significant loophole was left [in the Treaty] in the protections against SAM upgrade." (p. 257).

83. See U.S. Senate, Committee on Foreign Relations, Hearings, Briefing On SALT Negotiations, 95th Congress, 1st Session (Washington, D.C.: USGPO, 1977) p. 73. See also, Arms Control and Disarmament Agency, *Soviet Noncompliance*, ACDA publication 120 (Washington, D.C.: ACDA, March 1986) p. i.

84. See the discussion in, Jack Kemp, "Congressional Expectations of SALT II," *Strategic Review*, (Winter 1979), p. 22.

85. See for example, *Compliance and the Future of Arms Control*, of a project sponsored by the Center for International Security and Arms Control, Stanford University and Global Outlook (Cambridge, MA: Ballinger Publishing Co., 1988), pp. 35-39. See also, Longstreth, Pike, and Rhinelander, op. cit., pp. 54-56. Interestingly, a Soviet official reportedly admitted to a U.S. official that Soviet SAMs, in fact, had strategic ABM capabilities. As reported in the statement by Sen. McClure in, *Congressional Record-Senate*, September 1, 1985, p. S-14591.

86. Longstreth, Pike, and Rhinelander, op. cit., pp. 54-56, 60. Rhinelander goes on to argue for what the Administration has in fact now attempted to accomplish, i.e., an agreement with the Russians concerning, "specific guidelines between the prohibited and the permitted."

87. As presented officially in, Arms Control and Disarmament Agency, *Fact Sheet*, "The Anti-Ballistic Missile Treaty," May 25, 1994, pp. 2, 4.

88. In short, any future agreed Treaty adjustments may be more difficult, possibly impossible, to achieve because national positions can be driven by many unique economic, political, and security requirements--requirements that may have little to do with the Treaty or missile defense, per se. For example, negotiating positions

on the ABM Treaty could easily become part of the broader fabric of Russian-Ukrainian relations, precluding future agreements regardless of the Treaty question under consideration. Multiplying the number of Parties to the Treaty similarly multiplies the potential for unique national concerns and requirements to preclude future consensus. An early example of this was presented at the recent TMD conference sponsored by the BMDO. The Ukrainian speaker to the conference, Andrei Zhalko-Titarenko, included two points that illustrate the diversity of needs and views--and corresponding difficulties for any future negotiations--that Treaty multilateralization introduces. Zhalko-Titarenko observed that the need to keep Ukrainian technical experts employed at this point in time would shape Ukrainian views concerning missile defense and the ABM Treaty; and, that "anti-rocket systems with nuclear warheads have to be deployed." See, "Ukrainian Approach To Conversion Of Rocket Building And Technology Nonproliferation Problems," *The Seventh Multinational Conference on Theater Missile Defense*, June 21-24, 1994, United States Naval Academy, Annapolis, Maryland.